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Spring Songs, East and West

By EDMUND J. SAWYER
Illustrated by the Author

MANY PERSONS, presumably well trained in music, have claimed that birds do not sing. They insist that the notes of birds are not "musical", as students of music are taught to define the word; that birds do not follow the "musical scale". However technically true this may be, it is of passing interest to wonder what birds might think of swing, which some humans class as music. If music is an art—as, of course, it is—it would seem to be an art triumphant when it can stir the listeners' emotions to their deepest, fire their imagination, awaken fond memories and recreate the past. It is a common human experience for the songs of birds to do all these. So, to dispute the musical status of bird songs is to be tiresomely technical and academic. If music is not sound endowed with the power to thrill the emotions of the hearer, then it is time to ask what *is* music?

A bird's song may be truly defined as those sounds that a given bird produces characteristically at the beginning of the courtship season. The inspired "hymn" of the thrush, the chatter of the swallow, the tapping of the woodpecker on a resonant branch—all these sounds are essentially the "music" of the birds concerned. It is self-expression under the mating urge or instinct. No doubt the wide range of sounds compasses the variety of musical taste among female birds. For a moment it might seem incredible that the tap-tap-tap of the woodpecker's crude drum is the same in its nature and effect as the spell-binding vespers and matins of the hermit or veery. Yet, the tomtom and the Stradivarius both appeal to the musical taste of their auditors.

". . . THEN WILL COME THE 'O-KA-LEE' OF THE RED-WINGED BLACKBIRD"

The power that most bird-songs have for us is due mainly to early and long association, to memories of the birds, their native haunts and the seasons. These recollections give to each song its place in the scheme of avian vocalizing, and make every type of woods and fields the home of some "musician". This it is, above all else, which gives to every bird-voice the rank of music. Nature is one great auditorium with a special setting—marvelously and wonderfully adapted—for each perform-

". . . ANSWERED BY THE SONG SPARROW, LILTING FROM A PLATFORM OF PUSSY WILLOW"

er. The northern marsh is inseparable from the bass viol of the "hollow-sounding bittern"; there is no awakening in the mixed woods in April without the muffled drum of the grouse. The upland New England pasture is without a voice until the coming of the vesper sparrow. The ghostly cry of a solitary nighthawk overhead breaks the silence of dusk, and, at once, "there is society where none intrudes". And if we whisper to ourselves the rest of that passage from Childe Harold, ". . . by the deep sea, and music in its roar", we seem to hear above the breaking surf the cries of gulls and terns.

No voice can be spared from the chorus of the birds. Does our admiration for the violin or the trombone cause us to regret the trumpets and 'cellos of the orchestra? Thus the voice of each bird has its fixed place in the esteem of the hearer.

Raised on our northern border where several birds, regarded a little farther south as permanent residents, were actually migrants, I first knew the crow as a spring arrival. Only in such circumstances can one know how thrilling may be the "caw, caw, caw, caw-aw, caw-aw" of this bird. That call, awakening me on some early March morning, as the first high-flyer passed over our village, held a meaning all its own. It had all the potency of bursting buds and peeping frogs; it was the whole pageantry of spring expressed in sound. To me it was the first of all first signs of spring.

With rapture does the thrush's hymn enfold me,
I pause amazed to hear the mocker quote,
Some magic power the lark's song has to hold me,
But, love—ah, that is for the phoebe's note!

The welcome "fee'-bee, fee'-bee" of this earliest of fly-catchers, and the spectacle of the little gray bird pumping its tail with lively expressiveness, gives a picture of spring-come-to-stay. Threaten as she may, spring cannot now turn back. For me the phoebe's message of cheer means spring achieved; for you some other bird may bring such a message.

It is difficult, if not impossible, to list even a few of the earliest spring birds in any fixed order of arrival. This year the first may be a robin, a song sparrow, a flicker, or, perhaps, a meadowlark or kingfisher. Although I have occasionally seen individuals of all these in winter near our northern boundary, usually the first spring arrivals may be recognized as such by the numbers in which they appear. However, the song season does not wait for the coming of even the first of these returning birds.

Before the bare woods, the stark fields and ice-bound streams of winter have shown any other sign that spring is on the way you may hear a new note—the true song of the white-breasted nuthatch. The blackcapped chickadee, too, pipes a new and more musical call than the one we heard at Christmas. To these will soon be added the song of another permanent resident—that of our true lark, the prairie horned lark in our northeastern states. This bird, in one or other of its many local forms, fills a place otherwise almost vacant among early song birds.

A February thaw makes slush of the snow in road ruts, and lays brown and bare small patches of ground amid the snow. Then you may see a small gray bird mount steeply up and up, to float at last on fast-beating wings, a mere speck, apparently motionless, against the blue. Then listen for the cascade of warbled notes drifting down from that dizzy height.

Far more than sky, with sun and starry train,
Green fields or barren brown to him are worth,
He seeks no closer view of Heaven to gain;
He soars but for a better view of Earth.

As the ice begins to loosen along the edges of marshy places there comes a timid peeping from the first and most venturesome of the small frogs. They will soon be answered by the song sparrow, lilting from a "platform" of pussy-willow. Then, from the maples of the bordering wood, or from the alders and sear cattails deeper in the swamp itself, will come the "o-ka-lee" of the red-winged blackbird. To be close enough to see and hear a flock of these gossiping male red-wings is to experience one of the real events of early spring in birdland. No description could prepare one for such a display of spreading and folding of black wings and tails, inflating of bodies, craning of necks; and, with it all, the greatest tangle and jumble of squeaky, wheezy, clucking voices imaginable—

a perfect babel all speaking at once, each utterly regardless of all others.

The red-wing's is, nevertheless, the most agreeable voice of any of our blackbirds. To be sure, as with the grackles and other blackbirds, much of his "singing" is accompanied by gestures usually associated with a severe seasickness, so the red-wing may be better heard than seen.

The grackles, whose rusty creaking is produced with what appears to be a spasm of excruciating pain, make one group for whose songs I have pleasant associations. But there is another blackbird song for which early acquaintance might have engendered a memory even pleasant, that kindles in me no liking under any circumstances. Like the red-wing in the East, the yellow-headed blackbird is at home in the western marshlands. There he is a striking figure among the tules, conspicuous with a head, neck and breast of saffron, a white patch flashing on each black wing as he flies. Coming from the East, you will first meet him in the cattle country of Montana and Wyoming. As you have been driving west in spring you may have been hearing the wonderful song of the western meadowlark. And then you come upon this handsome blackbird. His song, you are certain, must be a thing of promise. Then, apparently hoarse beyond speaking, this avian Beau Brummel finally manages, by a physical effort that threatens to result in self-strangulation, to gargle out a feeble rasping sound in a vain effort at coherence. One turns from the yellow-head, for relief, to other bird-notes. Nor need one turn far.

On every side desert horned larks are soaring and singing; their songs are identically like those of the eastern species. Not so with the western meadowlark, who, of course, is a lark in name only. It is strange to hear this bird—to all appearances of color and action, our old friend of the eastern farmlands—give voice to a song distinctly new to us. Perhaps from prejudice, it sounds to us a trifle less musical; less ringing than that of the eastern species. But I fancy this may be due to the vastly greater auditorium of the open sagebrush country.

Traveling west in spring for the first time, the eastern

THE WESTERN MEADOWLARK GIVES VOICE TO SONG

"I FIRST KNEW THE CROW AS A SPRING ARRIVAL"

bird lover is sure to be specially delighted and impressed with the songs of quite another bird—the lark bunting. I was fortunate to reach central Nebraska just when the recently-arrived males had come into full song. One in particular was using a roadside fence-post as a rostrum. At frequent intervals, his black and white color-scheme flashing conspicuously, he would fly upward fifty or sixty feet, sing his brief but musical song, then return to his starting point, or to another post nearby. At intervals of ten to twenty miles I asked natives what they called this bird. In each case the reply was, "bob-o-link"! That is not so far off, one feels, when the male is seen at a distance. But the songs of the two birds bear no resemblance. A day or two later, in Montana, I found lark buntings in flocks composed about equally of males and drab females. None of the birds in these flocks had begun to sing; or, if any had, their singing must have been infrequent.

It is remarkable how lame and halt the calendar is to those of us who are accustomed to look directly to Nature for cues to the seasons. While the human race lumbers along, faithfully holding to traditions concerned with these static figures, the birds come each year and sing their messages of things which are, or which are to be. They are the true oracles. All the calendars and almanacs and legendary lore notwithstanding, the buds show little

signs of life, ice remains on the water till mid-morning, and cold gray ripples surface the lakes and ponds as the cutting mid-April wind whips across them. Then I see my first low-skimming swallows. The elements may now do what they will. The writing is on the wall! Put this down as certain; it was no true bird lover who said, "One swallow does not make a summer". The birds and their seasons, especially their seasons of song, are in accord and inseparable. Moreover, it is as true now as it was in Emerson's day that the sparrow, its song at dawn, and its alder branch, are all necessary parts of one picture, if it is to be a picture of Nature and is to bear her meaning.

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The Screw Bean

By DAVID J. MORRIS

In the semi-desert areas of our Southwest, down into Old Mexico, and westward to California, grows the tornillo, or screw bean, often called the rattlesnake's rattle plant. This is because the clusters of beans, coiled in a spiral and growing thickly on the branches, in a way resemble the rattles on the tail of the rattlesnake. To the botanists it is *Strombocarpa odorata,* and they place it close to the mesquite.

Each seed pod is spiral, having from twelve to twenty turns. There are from ten to twenty-five pods to each cluster, and, when ripe, they vary from light yellow to dark brown in color. The seeds are numerous, and form an important part of the food of a number of the desert mammals. They are also greedily eaten by domestic animals and in some sections are used as food by the people themselves.

In the parts of the West that are settled by Mexicans the small bushes are gathered and used to cover their huts. This thatching sometimes serves as a foundation for a layer of earth that, baked by the sun, becomes adobe, and makes a real rain-proof roof.

In poor soils, or where shifting sands render conditions unfavorable, the tree does not reach a large growth. But in parts of New Mexico and elsewhere the trees grow large enough to serve for fencing and a great number are cut for posts.

Where the groves are large, the Mexican goat herders drive their small herds among them, in the fall and winter, and the goats feed on the beans as they fall to the ground, or as the herders may knock them from the trees or bushes.

The wood of the tornillo is brown and very hard, and the grain, when properly cut and polished with fine sandpaper, is beautiful. Many curios and souvenirs are made from it by the Mexicans, and tornillo buttons are popular. These are cut from the wood, polished, and covered with ordinary floor wax. Paper knives, spoons, miniature dogs, and many similar ornamental items made from it are on the market. The root, as is the case with the related mesquite, becomes larger than the trunk and is also used commercially. Dug up and skillfully divided by sawing, it yields stock with a beautiful grain that makes possible the manufacture of buttons and souvenirs of many kinds, and thus has much economic value locally.

THE CURIOUS FACE OF THE LITTLE SILKY ANTEATER IN REPOSE

Small slits mark the eyes and a longer one the mouth. It is toothless but, for the special purposes of food-hunting, has a long tongue

The Little Silky Anteater

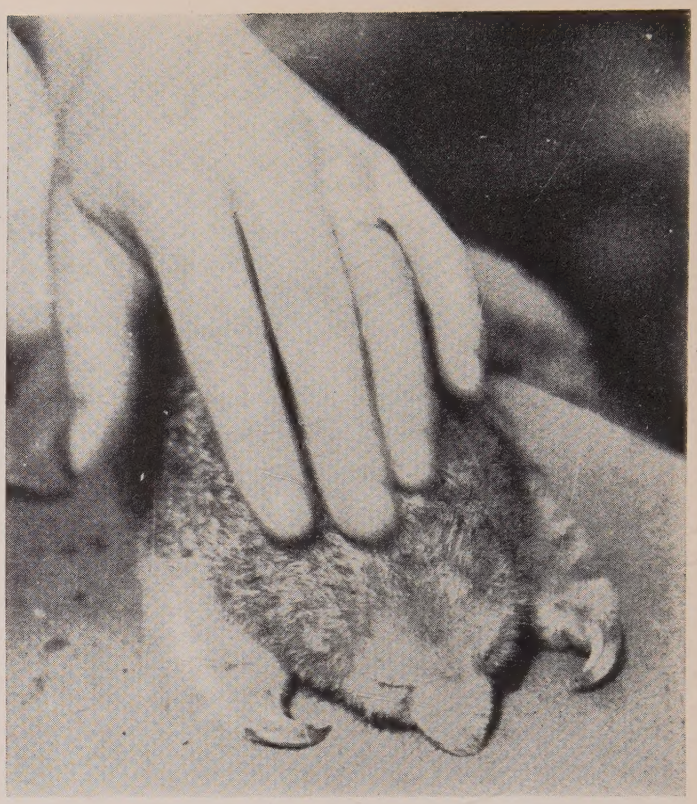
A rare little dweller of the Central American jungle

By V. WOLFGANG VON HAGEN

THE FIRST little silky anteater I had ever seen was curled up in a branch of a tall tree in the jungles of the Mosquito Coast. I would not even have known it was an animal had not the sharp eyes of my Miskito Indian spied it among the leaves. When he brought it down, clinging to the crotch of a branch, it appeared to be a round ball of silver gossamer. Its snout was stuck between its legs and its prehensile tail was wrapped tightly about its body. When I came near the animal suddenly raised itself to an erect posture. The tail took a firm grip on the branch, the pink-soled, curiously constructed hind feet—much like those of the great antbear—grasped tightly as it raised itself to its full height. Its two arms, each having two strong curved claws, were held in front of its nose.

It was a ludicrous attitude of defense. The little slits of eyes remained tightly shut, and had there been an assailant near, this nocturnal beast could not have seen it. In erect position it was not more than eight inches in height, and in its coat of uniform buff, it was so dainty and so clean that it seemed as if a child's toy had come to life. For some time it remained erect, swaying slightly, the sharp-armed hands in front of its nose. Then, evidently believing that the danger had passed, it relapsed into its protective ball. Again I shook its branch, and once more it raised itself in the attitude of defense. As I reached to detach it from its perch, the raised arm swished past my fingers, barely missing them. It was a vicious little hook of a blow, and those sharp nails could easily have torn my fingers deeply. So long as we did not molest it, it was content to stay curled on its branch, and in that position we bore it back to camp.

The silky anteater is one of the rarest animals in the American tropics. It is seldom seen, and, I believe, has never appeared in a zoological garden. During my various travels in the jungles I had heard the Spanish speak of a little animal, which they called *Flor de Balsa,* flower of the balsa, which seems to be a name for the silk-cotton tree. It was this silky anteater, and now I saw the reason for this name. When the seed-pods of the tree burst, the seeds are buried in a massive ball of soft, silverish fibers. The sheen of this silky mass and that of the little anteater are so strikingly similar that when I placed the animal next to a freshly opened pod, I could hardly tell the difference. Thus does Nature seek to protect her own.



IT IS ABOUT EIGHT INCHES LONG

Its sharp claws aid in its arboreal life, and can inflict a wound on occasion

The inoffensive little creature is arboreal and lives on termites and ants. It hates the sun as much as do the owls and bats and will not willingly move during the day, choosing for its resting place the topmost branches of a tree, there to sleep until night has settled on the jungle. It is the smallest relative of the giant anteater and the tamandua, the lesser anteater. Unlike both of them, however, it is arboreal (although it can, if it must, travel on the ground), and prefers to scratch at ants' nests in the trees, and rack with its little claws the carton nests of termites. When the cool of the night settles over the jungle the silky anteater becomes alive. The expressionless face, marked with merely tiny slits for the eyes, and a longer one for the mouth, is transformed. The eye of the animal is black and shiny, like a rodent's, and gives to the face an intelligent look. From the mouth darts its long worm-like, mucus-covered tongue, proclaiming its kinship with the anteaters. When the animal is given a bit of termite nest it thrusts its tongue into all the crannies and draws it out covered with the struggling inhabitants. Like a flash the tongue disappears, to emerge immaculate and to plunge again and again into the labyrinthine passages of the nest.

When moving in the trees, the silky anteater does not, like the sloth, travel upside down, but walks rapidly upright, the hind feet grasping the branch chameleon-like, while the front claws are turned in, pigeon-toe fashion, with the claws digging into the branch. Like the sloth its ribs are flattened and wide, and this feature may help to preserve it from attacks of its rapacious enemies of the night. Seemingly, as does the sloth, it fears most the sharp-eyed harpy eagle. While the coarse fur of the sloth is camouflaged to some extent by its crop of green alga, as it travels slowly among the trees during the day, the silky anteater, by its similarity to the bursting pods of the *Ceiba,* protects itself from its feathered foe by this ingenious mimicry.

Linnaeus, in 1758, named this little anteater *Myrmecophaga didactyla*—the two-toed eater of ants. More than sixty years later Gray gave it its present generic name *Cyclopes*—round-eyed. So much for the name of this strange and beautiful little jungle dweller.

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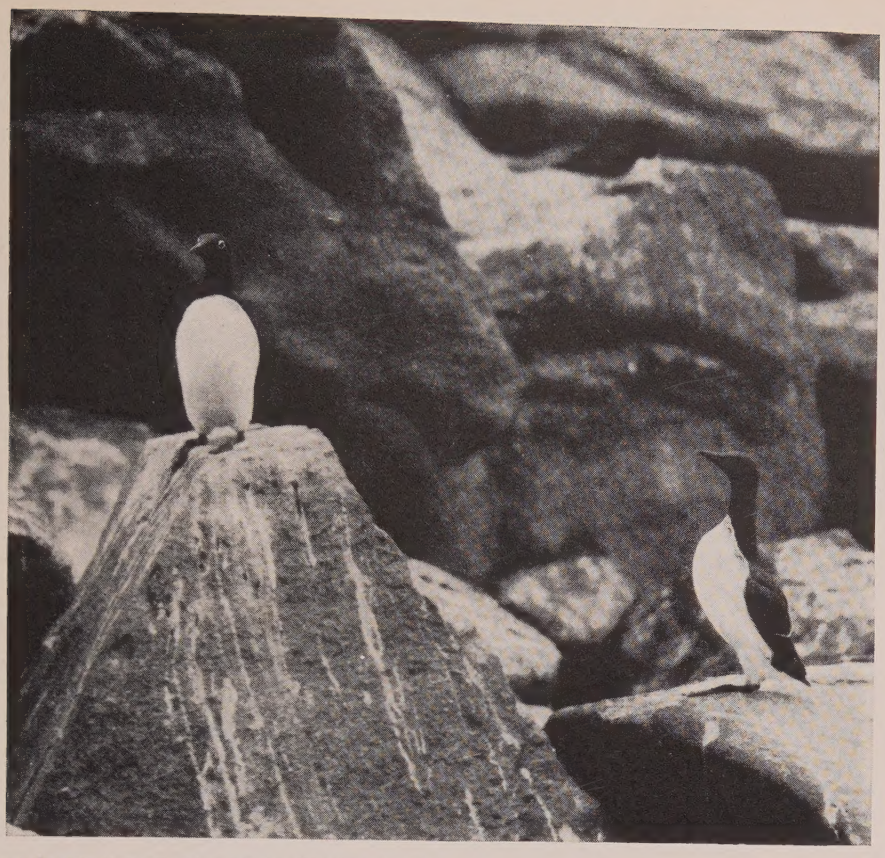
Spiders

By MARIE E. KRUSE

Aren't spiders funny fellows,
  Strutting 'round in blacks and yellows—
In fact, in almost any hue—
  Oft spangled with the early dew?
Perhaps you think the spider, too,
  An insect is; yet that's not true.
The spider has no neck at all,
  As insects have, both large and small;
His teeth for chewing have no use,
  For spiders live on insect juice;
The spider families think they're smart
  As on eight legs around they dart,
While insects are confined to six
  For travel over stones and sticks;
The air the spider breathes through slits
  As in his silken home he sits,
But insects breathe through tubes quite fine,
  (They have no lungs like yours or mine).
Spiders from their spinnerets
  Weave lovely silken, lacy nets;
But oh beware, ye Insect Tribe!
  Within these nets the spiders hide,
And when in them you're tangled up,
  They pop right out, on you to sup!



MURRES COME OUT TO ENJOY THE SUN
Note that the left bird has a white ring about the eye. This represents a mutation or variation of the common murre. Photograph by Alfred O. Gross

Wild Life in Baffinland

In summer many birds make this Arctic country fascinating

By JOHN RIPLEY FORBES

UNDER THE leadership of the veteran explorer, Commander Donald B. MacMillan, the Gloucester fishing and racing schooner, *Gertrude L. Thebaud,* set her sails for the great white Arctic. She carried a crew of college boys and a staff of scientists and her destination was Baffinland where, at Brewster Point, we found our farthest-north point of anchorage.

Near our anchorage, on a point of land, was a small Eskimo settlement of some thirty people who lived in sealskin tents during the summer and snow igloos in the winter. On both sides of the village, cliffs and rocky boulders rose out of the sea. These Eskimos, the most primitive we had met, dressed in sealskin clothing, the women wearing trains or tail-like projections on their jackets. Legend says that this is to protect the women from the polar bear. A bear, pursuing an Eskimo, can tell a man from a woman by this item of fashion, and he kills only the men.

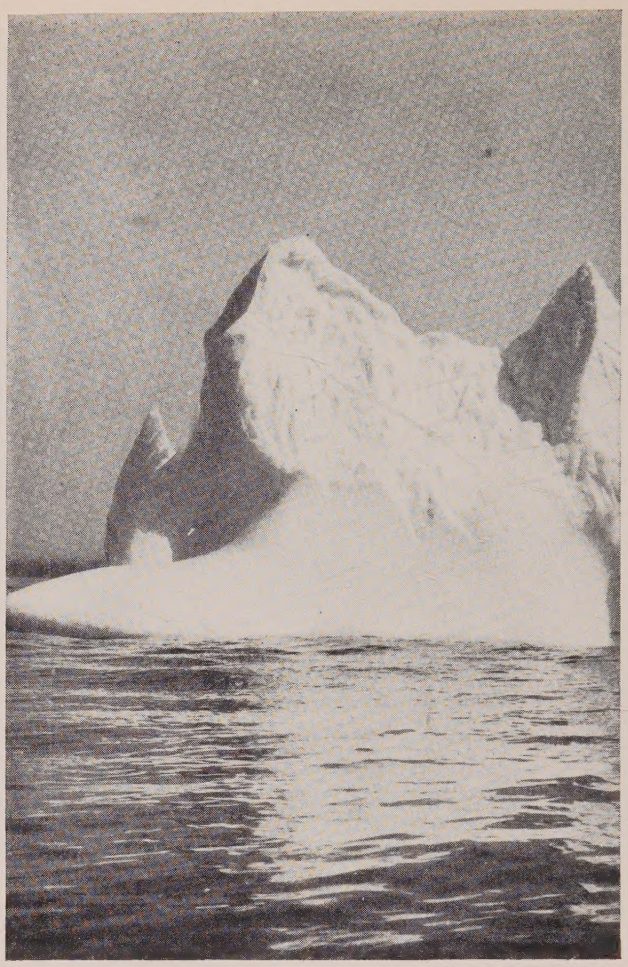
On the shore around the tents were many snow buntings, which, at their breeding grounds in the Arctic, do not look exactly like those we see around our homes farther south in winter. The male, when nesting in the Arctic, is snow white with the black markings on its wings and tail exposed by the wearing away of the brown edges of the winter plumage. It builds an attractive nest on the ground, usually well hidden among rocks or tufts of grass, constructing it of dry grasses and moss, and lining it with feathers or fur. In this cozy basket from four to eight eggs are laid.

Northern eider ducks were numerous about the islands in the bay. One nest, discovered among the rocky boulders of a hillside, lay in a beautiful bed of reindeer moss, and was a fine example of Nature's protective scheme. The eggs are laid in soft down taken from the mother's own breast. The bird had picked bits of reindeer moss from about her nest and had sprinkled it protectively throughout the down. The base and sides of the nest were especially well covered with bits of this lichen and, when danger threatened, the mother, before leaving, covered her eggs by hastily drawing over them the loose sides of the nest. This bird was nesting late, for most of the eider ducks had left their nests and some females and their young were seen swimming about the numerous islands.

The male eider is one of the most beautiful of our ducks, easily recognized by its black or dark underparts, mostly

white upperparts, and the green on its head. The female birds are beautifully marked with brown. A flock of eiders, flying in string-like formation, is a beautiful sight.

Shortly after discovering the eider nest, we saw a number of small birds flying among the rocks, calling sharply, "chack chack". Field glasses revealed them as Greenland wheatears. They would fly short distances back and forth from rock to rock, jerking their tails in nervous fashion as they went along. They seemed to like to do their strutting, so to speak, on prominent places such as the tops of large boulders and atop ragged cliffs. The wheatear is shaped something like a bluebird, although it is smaller, and is easily recognized by the white on its rump and the sides of the tail, which contrast with the black central tail feathers and terminal band of the tail to form a perfect T.



PHOTOGRAPH BY THE AUTHOR

COMPANION OF AN ARCTIC VOYAGE

Frequently as we passed these floating bergs, sea birds would be seen perched on their frosty pinnacles

After we had followed these wary birds for some time, one was seen flitting about a small cliff with a bill full of insects. A faint noise of young birds gave away the secret, and the nest was soon discovered, nestling in a crevice in the rock. The entrance was too small to admit one's hand. The four young in the nest were almost ready to leave. The nest was beautiful, built of loose dry grass and lined with the white feathers of the ptarmigan. The Greenland wheatear is listed as the rarest bird in Baffinland, so seeing eleven individuals and finding the nest made this a banner day.

While the wheatears held our attention a pair of Arctic hares were sighted some distance away among the gray boulders, slate-gray creatures with white cotton-like tails and long ears. They soon dashed off in different directions as though to baffle the intruders. Suddenly they stopped in their mad rush and, in a flash, appeared to have been swallowed up. Again Nature's remarkable protective coloration, so important and so evident in the barren Arctic wastes, played its part in her drama of the great outdoors.

We were returning toward our ship when one pair of keen eyes caught sight of a small weasel slinking among the boulders near a small stream. The Arctic weasel is much like our common weasel of the States, reddish-brown above and white underneath, and with large ears always on the alert for the smallest sound. He was only a few feet away, and had not seen or smelled us. So we watched with interest as he moved from place to place, now out of sight under a ledge and then apparently on the trail of something among the rocks. A sudden sharp squeal chronicled the end of a lemming, common rodent of the Arctic region. The lemming, about the size of a large meadow mouse, reminds one of a small guinea-pig. It is found in abundance among the rocks and on the tundra of the region. As we waited for the weasel to emerge from its dining place, a duck hawk swept over us to alight on the top of a nearby boulder. The duck hawk is the swiftest flying bird in the north and few birds possess the grace and skill with which this bird is gifted. The silhouette of this magnificent bird perched on a jutting rock against the dying sun was a fitting close to a fascinating day, one filled from dawn to dark with exciting episodes.

The American pipit was found to be common about Brewster Point, but it was too late in the season for nests. We had seen them and found their homes along the Labrador Coast enroute to Baffinland. The pipit is a small bird about the size of a sparrow, with a thin bill and white outer tail feathers, easily seen in flight. It has a habit of wagging its tail and travels by walking rather than hopping. At home we had seen this bird in our fields, and on salt marshes and beaches during the winter, for it passes that season as far south as Central America, returning in spring to the Arctic to raise its young.

The only shore bird seen at Brewster Point was the purple sandpiper, which nests farther north than most birds of this group. An octet of these birds were seen running about the shore of a small, rocky, wind-swept island, feeding among the rocks. It is stocky with slate-gray on its back and white on breast and belly, and with short yellow legs.

Three ravens were observed frequently near our anchorage. The northern raven is almost twice the size of a crow and has a much different call; its croaking "cr-r-ruck" is a common sound in the barren North.

Many colonies of glaucous gulls lined the steep and rocky shoreline of Peter Force Sound. The young, nearly

full-sized, could be seen perched on the rocks with their parents. Many of these beautiful birds flew about us as we passed their nesting colony. The glaucous gull or burgomaster is larger than our common gull, and is easily recognized by its large size and lack of black on the wings. It is an all-white gull, the largest, most powerful and most predatory of our gulls. It will not only rob other sea birds of the food they are carrying, their eggs and young, but will kill and eat smaller species of sea birds.

The "sea pigeons" or black guillemots, one of the most common of northern sea birds, which we saw almost every day during the expedition, would fly from their nests in nearby cliffs and alight on the water as we went by. Many of them nested about and among the various colonies of glaucous gulls. During one of the field trips in the region of Brewster Point, a female was taken and brought with her two young to the ship. Although perfectly capable of flying, she allowed herself to be captured rather than desert her young. The guillemot, rather a colorful bird with its black plumage, white wing patch and brilliant red-colored mouth, black bill and red feet, changes its color before winter and becomes largely white. Many times as we forced our way through the ice-pack we would come across a lone guillemot swimming unconcerned among the ice floes. We found these birds nesting in inaccessible places, in the crevices, rifts or fissures of the rock, usually high up in cliffs overlooking the sea. Two eggs were the usual number found in a nest.

PHOTOGRAPH BY ALFRED O. GROSS

EGGS OF THE COMMON MURRE, SHOWING VARIED MARKINGS

This bird usually lays one egg on the rocks without the protection of a nest. Their shape, shown in the picture, tends to keep them from rolling off the home ledge

Explorations inland failed to reveal any caribou, but several remnants of their horns were discovered near old Eskimo camping grounds. Graves of the Eskimos were seen at various places, the body usually placed on a high level exposed to the weather, but covered with rocks to keep predators away. An Arctic fox was heard and seen in the distance, but at no time could we approach this wary animal. Returning to our vessel at Brewster Point, we saw a common loon overhead. This loon, about the size of a small goose, with black head and neck, is less common than the red-throated loon. The latter is much the smaller, and has a gray head and neck, and a rufous-red throat patch. Often a pair of these birds, nesting near our anchorage, would fly out from the mainland, calling loudly, to circle over the water and then return inland.

One of the most attractive birds seen commonly throughout Labrador and Baffinland was the semipalmated plover. It is a small shore bird, brown above and white below, and with a single dark ring about its neck. Often we would discover a young one walking about on its long awkward legs while the old ones made frantic efforts to lead us away by feigning injury. These beautiful birds were seen in pairs with their young, and also in small flocks, both along the seashore and about the small inland ponds of fresh water.

Finally, with great reluctance, we parted from our Eskimo friends and Brewster Point. As we left our comfortable harbor we saw large numbers of guillemots swimming about among the ice floes as though to bid us farewell, and, perhaps, to invite us to come back some day.

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LAMENT FOR BINKER, HER MISDEEDS

By NANITA MACDONELL BALCOM

You may sleep soundly tonight, Mrs. Thrush,
  For Binker, the kitten, is gone.
No steely eyes in the raspberry patch,
No sudden pounce and no sharp claws that scratch
  Now Binker, the kitten, has gone.
No sputtering *ssz!* and no teeth that bite.
You may sleep soundly tonight.

She caught two of your birdies, *two,* Mrs. Thrush,
  That Binker, that kitten that's gone.
But Lynch took *her* off in his raggedy Ford
In a peach-basket tied to the running-board—
  Our Binker, our kitty, is gone—
She was a sweet kitty before she—hush!
Try to forget, Mrs. Thrush.

Australia's Bronze-wing

By CARL NAETHER

SINCE the bronze-wing pigeon is one of the most beautiful and gentle birds, it is a leading favorite among lovers of wild fowl. It comes to America from Australia, where these short-legged and rather plump pigeons often live on sterile plains, feeding on various grass seeds. At dusk they wing their way swiftly and dexterously to often distant water-holes. Usually they fly to within forty or fifty yards of the watering place and then walk into the water. As soon as they have quenched their thirst, they walk a distance away from the water before they are ready to fly off.

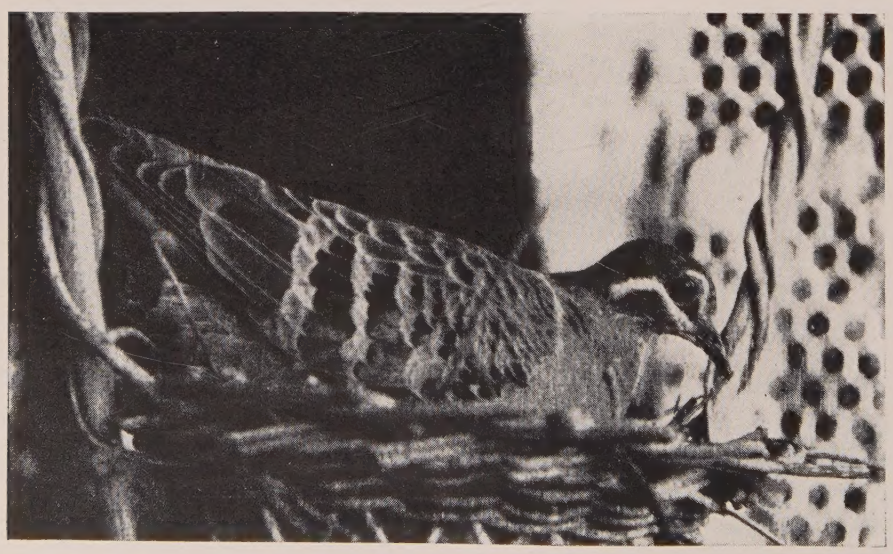
Unlike the domestic pigeon, the Australian bronze-wing is fond of angleworms and other insectivorous food, as well as of various kinds of berries. In certain sections of its native land, this attractive bird feeds largely on a small fruit strongly resembling a cherry, thus adapting its food requirements to the local offerings of Nature.

The bronze-wing pigeon derives its name from the four rows of metallic feathers in its wings, ranging in colors from a rich green to a fiery copper, and from a violet to a deep Prussian blue. In the bright light of the sun the beauty of these feathers is striking. Often the birds may be seen basking in the sun, one wing spread out like a fan, disclosing the varied hues of their plumage.

The period of incubation for this interesting foreigner lasts from seventeen to nineteen days, the male sitting during the day and his mate during the night. Among domestic pigeons, it is customary for the male to sit only from approximately ten in the morning until four or four-thirty in the afternoon, but hardly ever all day long. Naturally, the accompanying pictures show the male bronze-wing on the nest, since to have photographed these birds at night by means of flashlight might easily have frightened them off their nest permanently. This nest is built carelessly of twigs in an old flower basket hanging five feet above the ground. The birds have used this one nesting place time and again to the exclusion of all others. The fact that the basket swings violently to and fro whenever either bird alights on it has not disturbed the occupants in the least. On the contrary, they seem to enjoy the swinging motion.

An interesting characteristic of the bronze-wing pigeon is that they brood their young until they are fully feathered, feeding them by regurgitation as do other pigeons and doves. Frequently the young, which do not get the "bronze" until they are several months old, leave the nest at the age of two weeks, being fed thereafter on the ground by their parents for another two or three weeks. Domestic pigeons, on the other hand, brood their young only from ten to twelve days, by which time they are not even half feathered, but they remain in the nest for a full four weeks. Once they have left it, however, their parents continue to feed them only for a short time, usually not exceeding a week.

Of all the wild pigeons which are brought to American bird-keepers from foreign lands, the Australian bronze-wing pigeon is one of the gentlest, even though at mating time it will hold its own against any other pigeon com- (Continued on page 237)



AT THE LEFT, THE MALE ON THE NEST

At the top of the page is a twelve-day old nestling in the nest in the old flower basket provided for it

The Fourth North American Wildlife Conference

Education and research are outstanding themes of Detroit meeting of conservationists from the United States and Canada

By
R. W. WESTWOOD

Dedicated to Wildlife Week—March 19 to 25—in particular, and to the restoration of North American wildlife the year around, a sheet of eighty beautiful stamps has been issued by the National Wildlife Federation. The black and white reproductions of three of these are shown here, but the stamps themselves are in full color. Drawn by outstanding artists in the outdoor field, there are thirty bird pictures, fifteen each of mammals and fishes and ten each of trees and wild flowers. The stamps are available through state, county and local subsidiaries of the Federation, and through many other groups interested in wildlife restoration. Sheets may also be obtained, for one dollar each, from the National Wildlife Federation, Investment Building, Washington, D. C. Purchase of the stamps not only gives the buyer something of true beauty and value, but aids in the vital conservation program needed by our country today. An album for both the 1938 and 1939 stamps is also available from the Federation for twenty-five cents.

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OUTSTANDING for its increased emphasis on research and education, the Fourth North American Wildlife Conference, meeting in Detroit February 13 to 17, brought together more than eight hundred leaders in conservation from Canada and the United States. The first three days of the Conference were under the auspices of the American Wildlife Institute, and the succeeding two days were devoted to the programs and business of the National Wildlife Federation.

Presented in panel form, giving opportunity for the presentation of varied viewpoints, which were supplemented by free discussion from the floor, important phases of the conservation question were considered in general sessions. These included a review of our continental wildlife resources; the functioning of the Pittman-Robertson Act; the interstate problem of migratory fish; the public enemy—stream pollution; education as a tool for wildlife restoration; the problems created by mosquito control; the relationship between farmer and sportsman. Concurrently with the general sessions, technical sessions considered research progress in mammal, fish, waterfowl and upland game bird management and other related subjects. Particularly notable was the capacity attendance at these technical meetings.

Space does not permit more than a report on the high-lights of the discussions of the Conference. Its entire proceedings will, however, be brought out in book form by the American Wildlife Institute, and will be available for one dollar from the Institute, whose headquarters are in the Investment Building, Washington, D. C.

Speaking of the general wildlife situation, Dr. Ira N. Gabrielson, Chief of the United States Bureau of Biological Survey, reported progress through greatly increased research and greater appreciation of the importance of proper wildlife environment. He suggested that sportsmen's groups would do better to adopt projects for the restoration of habitat instead of fostering indiscriminate vermin control programs, "which, more often than not, are a waste of time and energy." Dr. Gabrielson said that there has been "a nice increase in the breeding stock of

migratory waterfowl, but not as good as those who would like to have more shooting privileges believe." He said that there is still room for "a lot more ducks" in Canada, that breeding conditions are better, and that the new refuge system is aiding in cutting the kill. However, he asserted, it will take ten years before the real importance of the refuges will be felt, and the kill must be held down until we can repopulate the breeding grounds. Dr. Gabrielson said that making the migratory waterfowl regulations is "a real headache", but that so long as he has anything to do with them they will be made on the basis of restoring the birds.

It is impossible, Dr. Gabrielson said, to satisfy the duck hunter, and pointed out that since the duck stamp was inaugurated in 1934, the number of legal duck hunters has increased from less than a half million to a probable million during the 1938 season. "The more people there are after the birds, the fewer there are to go around," he said, pointing out that the refuge program is only a little more than half completed with 13,500,000 acres in refuge status.

Delegates to the meeting of the National Wildlife Federation chose the following officers to serve during the year beginning May 1, 1939:
Honorary President—Jay N. Darling.
President—David A. Aylward, Massachusetts.
Vice-presidents—William L. Finley, Oregon; Colin M. Reed, Pennsylvania; Chiles P. Plummer, Wyo.
Secretary—Carl D. Shoemaker, Washington, D. C.
Directors-at-Large—George W. Grebe, Idaho; L. W. Wendt, Montana; Fae Huttenlocher, Iowa; Carl T. Fredericks, New York; Charles Giauque, Ohio; Justus H. Cline, Virginia.

Speaking for Canada, Hoyes Lloyd said that there is ample breeding area for millions more ducks in the great area of northern Canada. There was a general improvement during 1938 in the production of migratory waterfowl, he reported, and the year generally was good for wildlife.

Pollution was discussed from the point of view of the conservationist, the industrialist, the sanitary commissioner and the mine operator. Kenneth Reid of the Izaak Walton League urged conservationists to support the Mundt Bill for pure streams—H.R. 4170—if really effective control of pollution is to be accomplished.

Discussion of mosquito control projects centered around the injurious effects on wildlife of drainage of breeding areas, and the use of poisons at great cost to fish, bird and mammal life. Dr. Clarence Cottam of the Biological Survey cited instances of activities in the name of mosquito control that cannot be justified by the need or the results, and that have cancelled many wildlife restoration efforts. He urged a more open-minded attitude on the part of the U. S. Public Health Service, and study of means for control that give wildlife a chance.

The relationship between the farmer and the sportsman provided a subject of outstanding interest. As always, Dr. Aldo Leopold of the University of Wisconsin contributed sound fundamental thoughts as a basis for discussion. He turned back to the planks in the old game platform adopted ten years ago. One of these, he said, was to extend public ownership and wildlife management, adding that there has been a great increase in both, but not as much accomplishment in proportion to activity.

Another plank in the platform, Dr. Leopold pointed out, was to foster a more cordial understanding between the farmer and the sportsman. Nevertheless, he asserted, "it is still the prevailing policy to trade the landowner out of his right to post his land." Instead the farmer should be encouraged to post and to produce a wildlife crop, and, Dr. Leopold declared, there has been little progress in fostering cover improvement by the farmer, and regulation of kill. The only farmer who will improve his farm from the wildlife viewpoint is the one who shoots or who is interested in wildlife for the wildlife itself.

Dr. Leopold said that the last decade has seen a great expansion in research in wildlife management, almost to the point of an overproduction of specialists. Yet not even the best wildlife research is as yet accepted by scientists, and no scientific organization has contributed a cent to further it. He urged the recognition of the scientist and protectionist as playing an important part in game conservation. He declared that we need predators fully as much as the gun to regulate the supply of mammals, and that a moderate loss, whether by gun, tooth or claw has no effect on next year's crop.

Several pleas were made for greater vision by the sportsman in his relation to the farmer. Judge George W. Wood of Iowa declared that we must educate the hunter to the fact that he has no right on land without the consent of the owner, and pointed out that too many hunters think that because they have licenses they can hunt where they choose. Dr. Walter P. Taylor of Texas cited cases where landowners have derived much revenue by permitting hunting for a fee that pays for managing the wildlife on their property. John H. Baker of the National Association of Audubon Societies urged examinations for hunters before issuance of licenses, thus making the licensee's knowledge, both of wildlife and the regulations, a prerequisite of the right to hunt.

Word of the increasing interest of women in wildlife restoration was brought to the Conference by Mrs. Emily Bogert of Colorado and Mrs. Fae Huttenlocher of Iowa. They pointed out the missionary value of women in this field, asserting that all one has to do is to "tell Mabel" and she will spread the word of conservation.

Education and conservation occupied the major portion of the first day's sessions of the National Wildlife Federation. Dr. Thomas Eliot Benner, dean of the College of Education at the University of Illinois, discussed the practical problems of bringing conservation into the school curriculum. He said that the trend is away from a greater multiplicity of subjects and toward greater integration. Attempts to introduce conservation as a separate subject would encounter this trend and delay prog-

ress. He urged agreement on the social, economic and biological fundamentals, to be followed by a survey of the possibilities of working the conservation thought into the textbooks used in existing courses. He emphasized the need of educating teachers and using every type of educational research that can be enlisted.

John Caldwell of Tennessee pointed out that in the South much depends on conservation education, and that in a region where sixty percent of the land is eroded there is much human erosion as well. He said that the policy of the conservation authorities in his State, working with the education department, is not to teach children how to be hunters and fishermen but how to use their land. Three hundred conservation demonstration schools have been set up and the goal is to have conservation taught in every grade and in every possible course.

Dr. E. Laurence Palmer of Cornell described the work that has been done through the Rural School Leaflets in integrating conservation with Nature study work. He also outlined the study of conservation education nationally, and made possible through endowment of scholarships by the American Nature Association. On behalf of Arthur Newton Pack, president of the American Nature Association, all of the material gathered in this study was offered to the Federation if it wished to take over this important study.

Speaking for Wisconsin, where teaching of conservation in all schools is required by law, Dr. R. S. Ihlenfeldt emphasized the importance of bringing the concepts of conservation within the experience of the school children, acquainting them with their surroundings. He said that while it may be generally inadvisable to legislate courses of study into the school curriculum, it has thus far been a source of inspiration in his state.

Summing up the educational discussion, Dr. Rudolph Bennett of Missouri pointed out that there is a tremendous public interest in conservation but it is important to show exactly what it is the conservationists want. He urged that activities be directed toward the school child, the child in his activities outside of school and the adult. He asserted that regimentation of conservation on a national scale is impossible and that material must be formulated for various purposes, groups and regions.

The Conference closed with an address by J. N. Darling, who insisted that he be permitted to retire from the active presidency of the Federation, and with the election of officers who will take office on May 1.

One general impression to be carried away from the Detroit meeting was that of hopefulness. The group of sportsmen who operate on the theory that they can have their wildlife and kill it too, and who fight any onerous restriction, was conspicuous by its absence. The many sportsmen present were those convinced that our wildlife resources must be wisely husbanded and that no opportunity for their restoration should be overlooked. That the absent group will continue to exercise their influence in more obscure ways is undoubted, but the strength of constructive conservation viewpoints is rapidly growing.

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Koala Adorns a Stamp

By EDITH M. LAING

THE LITTLE creature pictured on a recent Australian stamp is the koala, *Phascolarctos cinereus,* a marsupial peculiar to that country, and now as much a symbol of it as the kangaroo. There are several geographical races. With its wide, furry, outstanding ears, bare black nose, and bright eyes, it is an appealing little animal. Unfortunately, however, it is threatened with extinction.

At birth the koala measures only one inch in length, and like other marsupials is quickly transferred to the maternal pouch. Not until about five months later does it emerge from this snug shelter. The koalas are tree dwellers, and descend to the ground only to get from one tree to another. Their sole food is the tender buds and leaves of certain species of gum trees, *Eucalyptus.* Furthermore, the animal must have access to a sufficiency of mature trees to be able to select those whose leaves are not toxic, for the foliage of young trees, and sometimes that of old ones, generates prussic acid of a strength that soon proves fatal. The animal knows instinctively, by scent, how to select the foliage that is both harmless and proper food.

In primitive times the animal had few enemies, but civilization, with its accompaniment of introduced dogs and foxes, banished that security. Then furriers found its soft, silvery gray coat a fine substitute for the costly chinchilla. An orgy of slaughter followed, during which millions of koalas, old and young, met their doom.

Being of a naturally amiable and confiding nature, the koala makes a lovable pet. To live, however, it must have its special food, and raising these animals in captivity has attained little success.

Australia now has a strict law against killing koalas, or shipping them alive out of the country. But this protection came almost too late, for nearly all of those left are the ones now being raised by naturalists in specially-planted sanctuaries. And even there, it is difficult to maintain a sufficiency of food trees to afford them proper and healthful subsistence through the year.

Australia, like other countries, is learning that its own unique forms of flora and fauna are among its chief assets; if you should visit there, one of your first sight-seeing jaunts in Sydney should be to Noel Burnet's koala park.

THE LARGE YELLOW LADY SLIPPER
This lovely orchid with pale green streamers at either side of its golden bubble seeks out rich woodlands

THE SMALL YELLOW LADY SLIPPER
In this we find a striking color combination, dark mahogany and bright yellow distinguishing this beauty

Lady Slippers Reign as Queens

By CAROLINE IVERSON

Photographs Courtesy of the Milwaukee Public Museum

"LADY SLIPPERS as a medicine." . . . "Lady slippers by the thousands."

This was the unbelievable picture that arose in our imaginations at the words of Albert M. Fuller, curator of botany at the Milwaukee Public Museum. He was guiding us to find lady slippers, not thousands, but just a few, and we were making a special field trip to a woods rising above the shore of Lake Michigan to find them.

Mr. Fuller had just told us about the early Wisconsin settlers and how they dug up the roots of the yellow lady slipper that colored the woods with thousands of blooms in the 1850's. Instead of admiring and saving the strangely-shaped flower for its beauty, these settlers merely used the roots in a feeble remedy that they dubbed "nerve tonic". Mr. Fuller's story impressed us as we thought of the few lady slippers today. And then I forgot all about the story as we arrived at the edge of our "promised land".

We had proceeded several hundred feet into the rich, moist woodland before I caught my first glimpse of the lady slipper. Then I saw it, startlingly beautiful, rising high like a golden bubble against the background of a single, cool green leaf, two pale green and spiralled petals winging to either side. I couldn't help knowing it was a yellow lady slipper, *Cypripedium parviflorum,* a large yellow, *pubescens,* as Mr. Fuller soon told me, because of its size and color and habitat.

The balloon-like lower petal, one and one-half to two inches long, with its small opening at one end, surely recalled a lady's slipper. With Mr. Fuller explaining, we distinguished the other parts of the flower: under the yellow balloon a pair of sepals had merged to form a broad, pale leaf, with two tiny tips; above the balloon and protecting it was another sepal; and then there were the two petals that I've already mentioned on the sides. The bloom waved on the top of a long stem having three to five alternate leaves, light green and parallel-veined.

"Probably the best known of our lady slippers," said Mr. Fuller, "the large yellow may be expected in swamps, on banks, and in rich woods from May to July through-

THE SHOWY LADY SLIPPER

It made a spectacular display of pink and white as it flourished among the royal ferns in the bog where it was discovered

out the northern half of the United States and in Southern Canada."

A year later it was that I saw the small yellow lady slipper, *Cypripedium parviflorum,* while botanizing with the same group on one side of Lake Wingra in Madison, Wisconsin. It was growing in a bog near a dogwood thicket, and bore all the characteristics of a yellow lady slipper and yet was different from the large yellow. Not only was it a smaller plant all around than its sister, the balloon cup this time being less than an inch long, but its color was different from the other's. The sepals and petals that were pale green in the large yellow were a rich mahogany color in the small yellow, an unusual, charming setting for the gold cup. Among ferns, in a tamarack swamp—from such a habitat this shy flower rarely strays.

We also found the white lady slipper, *Cypripedium candidum,* growing near the small yellow. Once the delicate flower was discovered, we all quickly gathered around to see this second rarest bloom of the lady slipper family.

Dubbed the small white by many, this lady slipper was less than a foot high. Its dainty little lip, five-eighths to one inch long, was polished white, with violet veining inside, and its pale green side petals and sepals were speckled with purple. It seemed too pure to touch. Growing well in the open among marsh grasses, on low prairies, in marl bogs or limestone soil, it may sometimes be discovered in certain sections of the northern parts of eastern and central United States.

For a real lady slipper treat, Mr. Fuller took us one day late in June to a bog near Grafton.

"This queen lady slipper or showy lady slipper, *Cypripedium reginae,* that I'm going to show you today overshadows even its cousin, the traditional hothouse 'orchid'," he said as we started out. "But you're going to have to work for it."

He wasn't fooling. We waded into a deep sphagnum swamp, water up to our knees, through a mass of poison sumac, until we began to wonder how we'd ever get back. Then we saw the queen lady slippers, growing in huge clumps, sometimes as many as two dozen blooms from one root system, and commonly two or three flowers on a single stalk.

The soggy bog no longer held our soaked feet captive now as we found one clump of blossoms more beautiful than the last. Singly and in mass the queen lady slipper was spectacular. A rosy stain at the lower end of its cup, soft white and roundly inflated, made it indeed a dainty queen. There were linings of rose and speckles of deep orchid inside the cup, pure white sepals and petals surrounding, and all peeking proudly forth from soft green, strongly-veined leaves that closely hugged the stem. Clumps of the plants had sought out the sunny spots in the spruce and tamarack swamps

SMALL WHITE LADY SLIPPER

A dainty plant. As many as eighty blossoms were found in a clump among the marsh grass beside a Wisconsin lake

that they loved and developed to a full height of two to three feet. From north to south in limestone regions of central and eastern United States and southern Canada it may be found flourishing in June and July by Nature lovers who will brave spongy swamps to find it.

In this same bog near Grafton, Mr. Fuller helped us add another lady slipper to our list—the pink moccasin, *Cypripedium acaule.* It grows singly, preferring to perch upon the sphagnum hummocks rather than brave the more watery valleys between hummocks. As another name, stemless lady slipper, reveals, what appears to be the stem is really the flower stalk and the true stem, very short, is underground. Two basal leaves, thick and strongly-ribbed, form the only foliage on the plant.

The pink, red-veined moccasin lip, by far the largest of all the lady slippers, two and one-quarter inches long, is unusual for its family. Hanging vertically, it is slit the full length on the upper side, the edges of this slit being softly folded under. The sepals and petals are yellow green, lined with brown purple. Besides sphagnum swamps, the pink moccasin likes acid soil and rocky slopes under evergreen or oak trees. Blooming from May to early July, according to latitude, it is found widely east of the Mississippi in the United States and east of Manitoba in Canada.

The rarest of the lady slippers, the tiny ram's head, *Cypripedium arietinum,* bloomed in a swamp just a few blocks from my home in Wauwatosa, a western suburb of Milwaukee, Wisconsin, forty years ago. To find it now I had to travel several hundred miles north along the shore of Lake Michigan to the Ridges of Bailey's Harbor in Door County. Here it flourished in a botanist's paradise with twenty-nine other species of the native Wisconsin orchids, including all the lady slippers except the small yellow.

Although it is very small, the unusual shape, coloring, and rarity of the ram's head combine to give it special interest to all orchid enthusiasts. Two horn-like upper petals, curving over the downy fuzz of the "brow" at the opening to the cup, plus the crimson netted white cup itself, which has tapered to a "chin", resembles a ram's head and explains the queer name of the flower.

We found the little ram's head, nestling singly or in clumps, underneath a tamarack tree, close to a small cedar. It was growing scarcely a foot high, and the lip of the flower was just a half-inch long. The two lower, purple brown sepals are not joined as in other lady slippers, but wave to the sides like the petals. The narrow leaves were more bluish than in other specimens of the family. Blooming from mid-May well into June, the ram's head may be looked for in swamps or nearby evergreen woods in our northern states east of the Mississippi.

Two hybrid lady slippers have been discovered and named recently by Wisconsin men, and have been reported in Ontario and Michigan as well. These are the Favill lady slipper, *Cypripedium favillianum,* and the Andrews' lady slipper, *Cypripedium andrewsii.* The Favill, a cross between the small white and the large yellow, was named by John T. Curtis, who in his research

THE LITTLE RAM'S HEAD LADY SLIPPER
Rarest of its group, it has a pink-netted cap and four narrow, purple-brown wings to attract insects to its swamp home

work on orchids at the University of Wisconsin has perfected a new way of propagating native orchids, including lady slippers, besides making other discoveries about the physiology of the plants. Mr. Fuller, who has been the guide for all our lady slipper field trips, named the Andrews' lady slipper, a cross between the small white and the small yellow, after Dr. E. P. Andrews, Portage, who has done much toward preserving orchids in Wisconsin.

"Dr. Andrews has been a pioneer in the task of saving our beautiful lady slippers," said Mr. Fuller, who probably knows better than anyone else how few lady slippers are now left in Wisconsin, as well as in some other states, particularly in the East.

"Our native orchids are doomed unless sanctuaries are set aside where they may be protected from picking and, most important, from habitat destruction," said Mr. Fuller. "The draining of bogs and clearing of woodlands that have accompanied our processes of civilization have carried with them the homes of our lady slippers. If we can keep the few native haunts that remain, we can give the lady slippers a chance."

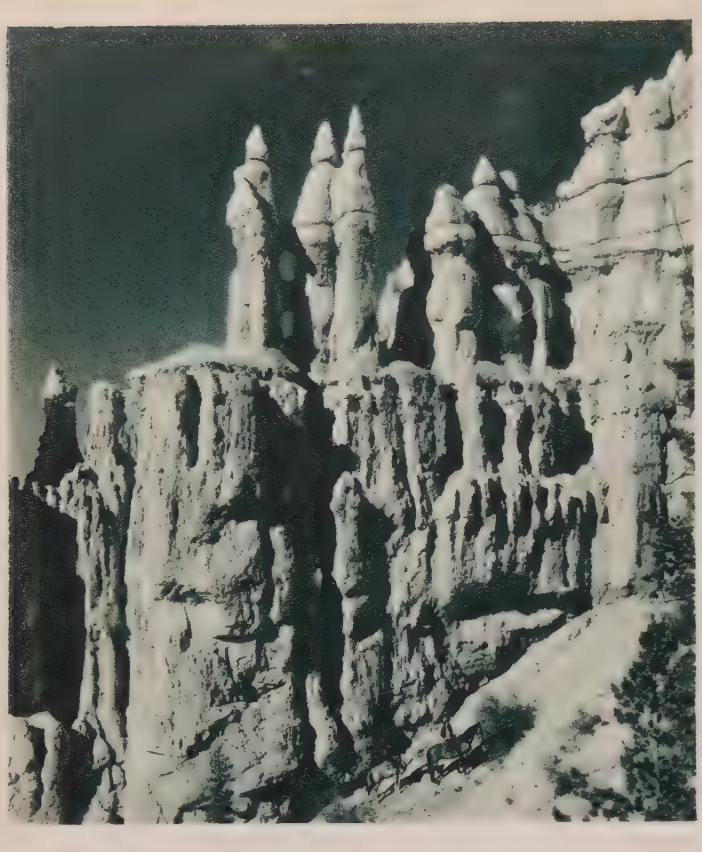
Mr. Fuller's plea is the plea of everyone who has seen a lady slipper, whether it be the yellow or the queen or one of the others. We all have picked out our favorites, and we wouldn't want any of them destroyed.

Let's not permit our lady slippers to disappear like the passenger pigeon. Let's take care of them now, and maybe we'll have "thousands" again some day!

WHEN VACATION COMES

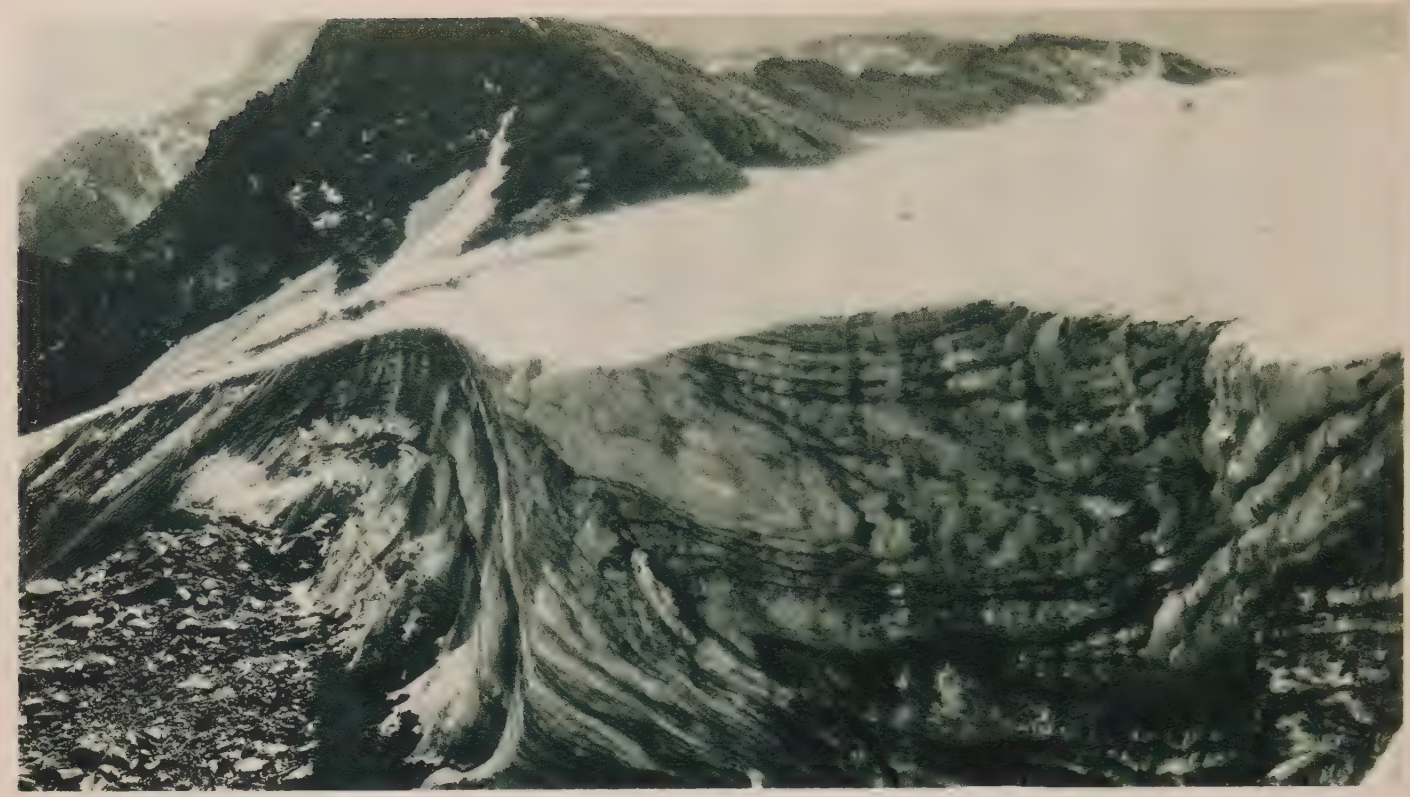
No wars or alarms of wars, no international hatreds and barriers, confront the vacationist who turns for relaxation to the great scenic areas of the United States and Canada. They offer vacation opportunities for every taste and for nearly every pocketbook. And they provide memories and experiences—the real dividends of any vacation.

For those who love the rugged, roadless mountains, there to camp and climb, the Teton Range offers special allure. Above we see Mount Moran and Jackson Lake, in Grand Teton National Park, Wyoming, effectively photographed by the infra red process by the Union Pacific photographer. At the left are Ribbon Falls, just under the North Rim of the Grand Canyon, like a scene in fairyland. Like a Grand Canyon underground are scenes in Carlsbad Caverns, now a National Park, in New Mexico. Courtesy the Santa Fe Railway.



Many are the fantastic formations to be found in Bryce Canyon National Park, and the Three Goblins above are typical. Completion of Boulder Dam has resulted in the creation of the Boulder Dam Recreational Area in Nevada. At the right, above, is a view up the lower reaches of the Grand Canyon of the Colorado River from the head of navigation on Lake Mead. A scenic boat trip across this lake and up this narrow and wild canyon is an exciting experience. The sequoias of Sequoia National Park, California, have their own allure; great trees that have known centuries of life. National Park Service Photograph. Here is Bridalveil Fall from Artist's Point, Yosemite National Park. Said John Muir, "The joyful, songful streams of the Sierra are among the most famous and interesting in the world, and draw the admiring traveler on and on through their wonderful canyons, year after year, unwearied."

Campers in the Amethyst Lake section of the rugged Tonquin Valley, Jasper National Park, Alberta, Canada, have guests in camp—wild deer, now, in summer, confidently feeding on grass or on any handout. Photograph, Canadian National Railway. Glacier National Park, Montana, is full of scenes of breath-taking beauty. Such a one is this of Mount Jackson from the St. Mary Valley Trail. Photograph by Hileman, courtesy Great Northern Railroad.



Not far from Yellowstone National Park, and an increasing attraction to visitors to this outstanding area, is Grasshopper Glacier. Here we see its face, sixty feet deep, where millions of locusts, chilled as they flew over the mountain perhaps centuries ago, were imbedded in its successive strata. This is in the Beartooth Range, near Red Lodge, Montana. Photograph courtesy Northern Pacific Railway.

Great Smoky Mountain National Park in North Carolina and Tennessee holds varied beauty. At the left, below, are moss-covered rocks below Rainbow Falls on the Mill Creek Trail to Mt. LeConte. Photograph copyright by Thompson.

Some like to have all the comforts in the wild, and an easy chair on a terrace at Banff Springs Hotel, Banff, Alberta, Canada, provides just that. This view of Bow River is one never to be forgotten. Around Banff there is ample wild area for the hiker, camper and trail rider, however. Photograph courtesy Canadian Pacific Railway.

Some Common Reptiles

By E. LAURENCE PALMER

ORDINARILY, our common reptiles are either liked tremendously or much despised by those who have any interest in Nature. As with many things, they are liked best by those who know them best.

The major groups of reptiles include the turtles, the snakes and the lizards. Members of each group are here pictured and described. A general consideration of the reptiles as a group is given at the end of this article.

The Turtles

IT IS difficult to generalize safely on these interesting animals. One widely-used book for children says that they are harmless—yet an alligator snapper, of our southern states, with one snap of powerful sharp-edged jaws, can remove one's finger, and the soft-shelled turtle can inflict a serious bite.

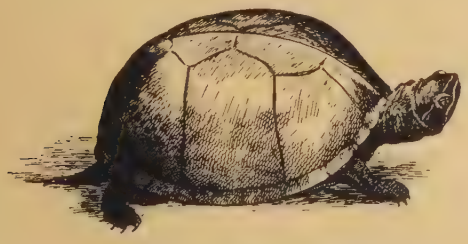
The impression is widely prevalent that all turtles live to great ages. This is undoubtedly true of some of the larger species, and there is reliable evidence that some of the smaller kinds reach at least forty years.

According to one ancient myth, the earth was supported by four elephants that stood on the back of a giant tortoise, which moved slowly and steadily about, causing the apparent movement of the heavens above. Today, in China, sacred turtles are fed by superstitious persons, who believe they are buying favors with the gods.

In literature, turtles have found a place for themselves. Gilbert White in his *Natural History of Selborne* made one turtle famous by recording its activities in his garden. Dallas Lore Sharp made another immortal by writing "Turtle Eggs for Agassiz". And Raymond Ditmars has published many interesting accounts of turtles he has known. In imaginative literature turtles are used to represent many traits, from stolid conservatism and canny intelligence to recklessness and dumb buffoonery. The way Br'er Terrapin won his freedom from his enemy, by insisting that he be thrown anywhere but in the water, credits the animal with intelligence belied by many of its real acts. Yet no one can question the instinct with which turtles hide their eggs in territory unknown to them most of the year.

In fable, the hare and the tortoise figure prominently, but few fictitious turtles have won more friends in recent years than the turtle in Walt Disney's "Snow White and the Seven Dwarfs". We all hope that the live turtle that posed for the part in that picture—and who is reputed still to be wandering about the Disney Studio—may live a long and a happy life.

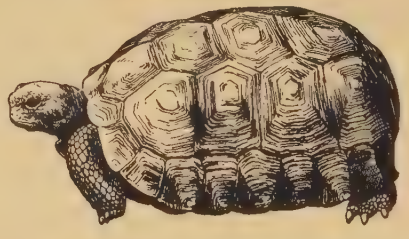
The oldest known turtles of the earth are found in the Upper Triassic beds and looked not much unlike our present-day alligator snapper. While the modern leatherback turtle may reach a length of six feet, in Cretaceous times the inland seas of America boasted turtles twice as long and weighing more than three tons.



MUSK TURTLE

SPOTTED TURTLE

BOX TURTLE



DESERT TORTOISE

PAINTED TURTLE

SNAPPING TURTLE

The Snakes

MORE people get their impressions of snakes from folk-lore and superstitions than from Nature facts, or from the snakes themselves. The result is unfortunate for the snakes, and, in some cases, for ourselves.

Virgil wrote, *Latet anguis in herba,* and ever since snakes in the grass have boded ill. Even in *Genesis,* where the goodness of the world is portrayed, the poor serpent gets what may have been unfair publicity and blame.

Whether we study the snakes of Medusa's head, or those of our backyard, we will have a dynamic experience, and we will always find doubting Thomases who will question the conclusions we may reach about snakes through our own experiences. "Seeing snakes" is not normally considered a happy experience, but some writers have been kindly in their treatment of the animals. One who wrote that "words" were "like a cloud of winged snakes" may not have thought of them in an unkindly way, and Shakespere expressed some sympathy for them when he said something was as "comfortless as frozen water to a starved snake".

Kipling, through his Jungle Books, gave many of us an attitude towards many forms of wild life, and in them he was fair to snakes. The kindly python who helped Mowgli, and the villainous cobra, and Rikki-tiki-tavi, give this group of reptiles an even break.

There are probably few groups of animals on which it is more dangerous to generalize than on snakes, and there are few on which more generalizations are made. Either we are for them, or we are "agin 'em".

In the half dozen snakes listed here the rattlesnake has been chosen as representative of the genuinely poisonous species. Contrasting with it is the valuable king snake, which may destroy the rattler. Among the innocuous species, there appear representatives of the toad-eating hog-nosed snake and the earthworm-toad-eating garter snake, whose food is more valuable to us alive than dead. Similarly, the water snake likes to eat the things we like to have live. On the other hand, the gentle green snake, which can be a "snake in the grass" more effectively than almost any other species, is exceptionally valuable as an insect destroyer. It should be plain from this that any attempt to generalize on snakes, and say that they are good or bad, would be hopeless; and any practice aimed at crushing all snakes under the heel lacks intelligence, which we pride ourselves on having.

As in most other systematic groups of animals we find representatives of snakes living in different kinds of habitats. The trees, grasslands, dry sands and waterways—each has its appropriately modified snake species. The living snakes of our time include some 2000 species. Some—like the sea snakes of the Indian Ocean—may never come to land. Most snakes, however, have been inhabitants of the land. Because of this, there have been relatively few fossil snakes discovered. The earlier of these appear in late Cretaceous time.

RATTLESNAKE

SMOOTH GREEN SNAKE

HOG-NOSED SNAKE

WATER SNAKE

KING SNAKE

GARTER SNAKE

The Alligators and Lizards

An old proverb tells that it is "better to be the head of a lizard than the tail of a lion". It is doubtful that the lizard was held in high repute by whoever wrote this, and, while lizards provide motifs for the art and sculpture of many early peoples, it is not always plain whether this was due to respect or to fear. In modern times, too, many people fear these animals, only one living species of which is known to be poisonous or similarly dangerous. Of course this does not apply to the powerful and destructive jaws of the alligators and crocodiles, but it does apply to every lizard in the United States except the Gila monster.

Possibly those who have lived in the Tropics, and have had the opportunity of watching geckoes catch insects at night about the lights, develop a better appreciation of lizards than those who learn of the group through seeing them at circus side shows. Even the circuses have done something to acquaint people with lizards by selling chameleons for pets, but generally these animals are sold without instructions for care, and it is doubtful if many of the pets survive the treatment they get from uninformed owners.

Horned toads are reasonably well-known and long-suffering pets, brought East by visitors from the West. Repeatedly they appear on the front pages of our newspapers in stories of being entombed alive for long periods of time. They are no more entitled to this reputation than to the fear that their grotesque appearance causes in some people. Interestingly enough many artists who have attempted to imagine life elsewhere than on the earth have frequently provided these extra-terrestrial people with the characteristic horns of the horned toads.

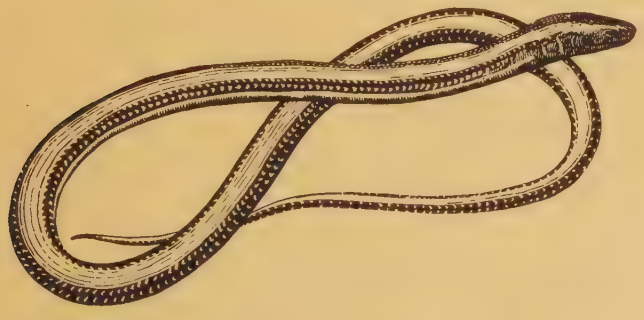
While the snakes eat only living animal matter, the lizards and the turtles may have widely-varied diets. Some live only on plants; some on one kind of animal and some on another. For the most part, however, the more abundant species are among the best of our insect destroyers. As such, they perform a function essentially worthy.

True land lizards have inhabited the earth since the Triassic Age, the oldest having been found in South Africa. These early animals rather closely resemble our modern iguanas. The lizards obviously have always preferred the warmer parts of the earth, being universally absent from the polar and other neighboring cold regions.

There are today about 2000 species of living lizards. The largest of the living species are about six feet long, although most lizards are much smaller.

Both the Crocodilia, to which the alligators belong, and the Lacertilia, to which the lizards belong, have teeth. In the former, however, these are set in pits in the jaw bones, while in the latter they are not. The vent of the lizards, like that of the closely-related snakes, is a slit across the body. In the Crocodilia it runs lengthwise.

Our alligators have broad jaws that show no teeth when the mouth is closed. The crocodiles, on the other hand, have pointed jaws, which, when closed, show the fourth tooth on the lower jaws. While native crocodiles are known in salt marshes of Florida, they are not common.



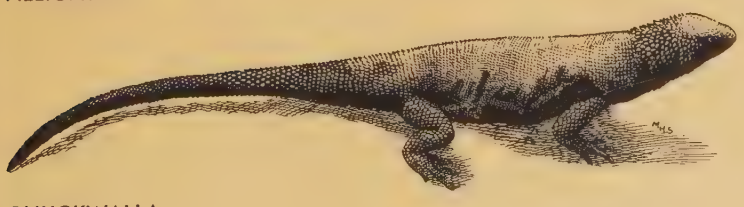
GLASS SNAKE

FENCE LIZARD

GILA MONSTER

ALLIGATOR

TEXAS HORNED TOAD



CHUCKWALLA

NAME	GOPHER TURTLE Desert Tortoise *Gopherus agassizii*	BOX TURTLE *Terrapene carolina carolina*	PAINTED TURTLE *Chrysemys marginata marginata*	SPOTTED TURTLE *Clemmys guttata*
DESCRIPTION	Upper shell, 10 inches long; 7, wide; 4½, high. Lower shell, 10 inches by 6. These measurements greater than for the eastern gopher turtle. Fingers and toes on each limb, club-shaped and closely bound together with only last joint free. Scales, with conspicuous, concentric markings.	Upper shell, 5 inches long, by 3¾ wide, by 2¼ high; lower shell, 4⅝ long by 3¼ wide and hinged. Males, with red eyes; females, with yellow or brown eyes. Backs, high, arched and with a blunt middle ridge. Uniformly dark-brown or black, marked with yellow streaks and spots.	Upper shell, about 6 inches long; 4½ wide and 2 high; lower, 6, by 3½ by 3¾, with a front lobe. Back, wide, unnotched, unridged, smooth, olive to black, red-marked on sides, and lower shell, yellow. Tail of male, 1¾ inches long; of female, 1¼ inches.	Upper shell, 4¾ inches long by 4 wide by 1¾ high; lower, 4 inches by 2¾. Upper, with round, yellow spots on black background; no ridges on back or notches at side. Males, with dusky jaws, black necks, 4¾-inch animals with 1⅞-inch tails. Females, with yellow jaws, smooth necks, 1½-inch tails.
HABITAT	Deserts and similar dry places.	On land, in open or brush-covered country, often remaining for years in a relatively restricted place.	In shallow, mud-bottomed ponds, frequently seen sunning on exposed logs or lying submerged with just tips of noses out.	In marshes, ponds and sluggish streams, often assembled in considerable numbers on floating objects.
RANGE	Deserts of southwestern Arizona, and southeastern California into Nevada, a smaller related species in southeastern states. Larger relatives in Galapagos Islands.	Eastern United States from Maine to Georgia and west to Tennessee, western Illinois, and northward to central Michigan, with related species extending the range farther.	Central lowlands, west to the Mississippi and the Missouri and north into Wisconsin, Michigan and northern New York, with related species extending the range.	Eastern United States from Maine to northern Florida, and in northern part west and north to southern Michigan, with related species extending the range.
CLASSIFICATION AND LIFE HISTORY	Class Reptilia. Order Testudinata. Family Testudinidae. Adults may follow regular, beaten paths. Probably live to great ages. Some Galapagos species have individuals weighing more than 300 pounds, which probably are more than 400 years old. Eggs are laid in sand exposed to sun. Independent from the first.	Class Reptilia. Order Testudinata. Family Testudinidae. Eggs laid in June in a hole dug in ground, usually in loose soil under leaves; 3 to 8 in number; shaped like hen's eggs with thin, hard shells; 1⅖ by ⅘ inches in size. Incubation about 70 days. Young rarely found. Individuals known to have lived 40 years.	Class Reptilia. Order Testudinata. Family Testudinidae. Eggs laid June, or July, in nests in stumps usually near edge of water; 5 to 8, each 1.2 by 3.5 inches; long, blunted, egg-shaped, smooth, glazed and with soft shells; hatch in late summer; little turtles like the adults; independent from the first.	Class Reptilia. Order Testudinata. Family Testudinidae. Eggs laid in June buried in sand in groups of 2 to 4; each egg, 1⅖ by ⅗ inches, white and elliptic in outline. Hatch in about 82 days; the young have a single spot on each back plate; independent from the first. Young make way quickly to water, which is home until next breeding time.
FOOD AND BEHAVIOR	Food, largely plant materials such as clover, lettuce, bananas, berries and vegetables, which may be taken from the hand after the animals have been tamed. Protection by hard shell. Do little of an aggressive nature in self defense.	Food, plant material, worms, slugs, snails and insects procured in travels and eaten out of the water, of course. Protected efficiently by shells, which can close so tightly that a pencil cannot be forced to reach a soft spot. Never aggressive and make excellent and interesting pets for children.	Making food of water plants and dead or living animals, captured while it is swimming about under water. May eat under water only. In captivity, eats beef, earthworms or lettuce if left in aquarium or pool, but may also attack fishes there. Protection by retiring into shells or dropping into water.	Food, dead fish, water plants and insects captured while the turtle is prowling around under water and which must be eaten under water. Commonly go into hiding in grass after a good meal. In captivity, will eat lettuce and other delicate plants. Protection by hiding and by retiring into shell when disturbed, but may be fearless under certain circumstances.
REACTIONS TO HEAT, LIGHT AND DISTURBANCE	Favor temperatures of from 85 to 95 degrees F., at which they can move about as fast as a man walks. Must have environment dry at all times to prosper or survive.	In winter, burrows in soft soil to below the frost line, sometimes going down as much as two feet or more. Likes warmth. Sometimes estivates in mud.	Enjoy sun and warmth during the summer months. Hibernates under water, sometimes emerging in spring when ice still remains. Sensitive to disturbance.	Apparently enjoy sun and warmth. The usual season in the northern part of range is from early April to November, with the interim spent in hibernation.
USE TO MAN AND ROLE IN NATURE	Useful as food, but should not be eaten because of danger of extermination. Interesting scientifically as descendants of species more common in the past.	Useful destroyers of garden pests. Make good pets; now protected by law in many states. Most gentle of all our turtles.	Make excellent pets and serve as scavengers of ponds and pools. Of no value as food since their flesh is poor. Almost impossible to make them bite a person. Active season, March to October. Not protected by law.	Of no commercial value and certainly of no food value. May make acceptable and interesting pets for aquaria and home pools, particularly when small, and may serve as scavengers in natural waterways.

SNAPPING TURTLE *Chelydra serpentia*	MUSK TURTLE STINK POT *Kinosternon odoratum*	HOG-NOSED SNAKE PUFFING ADDER SPREADING ADDER *Heterodon contortrix*	SMOOTH GREEN SNAKE *Liopeltis vernalis*	GARTER SNAKE *Thamnophis sirtalis sirtalis*
Length, extended, to 3 feet; an average animal has upper shell about 1 foot long and 8-inch lower shell. Under parts not well protected by shell. Back, with three broken ridges of coarse scales with a border row, giving notched outline at rear.	Upper shell, 4 inches long by 3 wide and 1⅞ high; lower shell, shorter and, in adult, with hind portion hinged. Tail of females, ⅞ inch long; of males, ⅓ inch. Backs high, dull brown, notched at rear and narrow.	Length, to 3 feet. Scales, keeled and in 25 rows. Head of a 2-foot snake, 1 inch wide by 1¼ long. General appearance, stocky. Brown or red with about 28 dark patches between head and tail; belly, yellow, blotched on edges with black. Snout upturned. Not poisonous.	Length, to 20 inches. Scales, smooth, in 15 rows, pale green, those beneath being lighter. Anal plate, divided. Tail, about ⅓ the length. Stouter than the keeled-scaled green snake, which is also yellowish instead of whitish beneath. Scales, distinctly shiny.	Length, to 36 inches. Usually with stripes. A central light-colored stripe down the back is bordered on each side by a dark stripe. Sides, usually darker and under parts lighter. Females, often larger than males. Head, distinct. Scales, ridged and in this species in 19 rows.
In lakes and other waterways, usually where the water is relatively quiet, and the bottom is mud-covered.	In lakes and slow, mud-bottomed streams of fresh water; apparently may live indefinitely without leaving water, except to lay eggs.	Dry sandy places such as gardens and roadsides, particularly in the open, where they may lie in the sun.	Common in range in the grass and shrubbery, or under stones, favoring open places rather than woods.	Common in meadows and grasses, under stones or in rock piles and, at some seasons of the year, in balls.
Eastern North America from southern Canada to the Gulf of Mexico and west to the Rocky Mountains. Western tributaries of Mississippi followed to sources. South to Ecuador.	Eastern and southern United States from Canada south, and west to western Missouri and southern Texas.	Eastern states from Massachusetts to Florida and west to Texas and Minnesota, with related species extending range west and south through Arizona into Mexico.	Southern Canada through the eastern and middle states and south to Florida, Texas and New Mexico. Several East Asian and one American species.	Eastern United States and Canada north to about the 50th degree of latitude and west to Minnesota, Wisconsin and Missouri, with other species extending range.
Class Reptilia. Order Testudinata. Family Chelydridae. Females leave water in early summer to lay eggs back from shore in holes dug in loose soil. Eggs, 24 to about 40, spherical, ⅞ inch in diameter, white, with thin, parchment-like, hard shells, usually buried about 5½ inches in soil. Incubation about 90 days.	Class Reptilia. Order Testudinata. Family Kinosternidae. Eggs, laid June or July on land in nests in groups of from 3 to 7; each, blunt-ended, smooth, glaze-surfaced, thick-shelled and nearly twice as long as thick; young, like adult but with ridged backs; olive and black in color. Independent from the first.	Class Reptilia. Order Squamata. Sub-order Serpentes. Family Colubridae. About 2 dozen, white, leathery, at first elongate but later spherical eggs, laid in early summer in clusters that stick together and absorb moisture and increase in size about ⅓ during incubation.	Class Reptilia. Order Squamata. Sub-order Serpentes. Family Colubridae. Eggs, 4 to 12, laid in July or August, usually stuck together in twos under warm stones, long, covered with thin, easily indented, parchment-like shells. Hatched by warmth of sun. Newly-hatched young about 5 inches long, dark olive and unusually active.	Class Reptilia. Order Squamata. Sub-order Serpentes. Family Colubridae. Mate in early spring or summer. Young born alive in mid-summer, 10 to 50 in a litter. Young resemble adults except in size; quickly begin to lead independent lives.
Food, animal matter, usually living, captured by vicious rapid dartings of head and snapping of hard, strong, sharp-edged jaws that may cut off a finger. Slow movement deceiving since heads may strike most unexpectedly. May lie submerged with just heads above the bottom ooze for a long time.	Food, live or dead animal matter such as fish, tadpoles and insects caught prowling around the bottom. Protection by aggressive disposition, hiding, offensive strong odor and shell, which may be closed somewhat by hinge. Well-developed appetite.	Food, essentially toads and frogs, the lighter individuals having been noticed by Ditmars to eat toads and refuse frogs. Food, swallowed whole and held by teeth in base of jaws. Protection by escape, by coloration and by habit of feigning death, even to extent of repeatedly turning over on back when disturbed.	Food, largely small animals; spiders and insects, particularly smooth caterpillars, grasshoppers and crickets, all of which are captured and held by the mouth alone. Food killed by being swallowed. Protection almost solely through color, since these snakes rarely fight back or resent interference from anything. Do not eat frogs or salamanders.	Food, essentially earthworms, frogs, toads and some insects, and, since most of these are useful, the value of these snakes may well be questioned. Food caught in mouth and crushed by jaws or pounded on the ground, but not crushed by constriction with the body. Jaws permit eating unusually large animals. Frogs and toads swallowed head first.
Mainly diurnal, but rarely, if ever, leaves water for sunning. Seeks food both night and day. Normally hibernates in deep water, where they may remain more or less active.	Active mostly from April to September during day or night. Do some sunning on logs in early season.	Favor sunshine. Hibernate during the winter months. Sensitive to disturbance, and puff the bodies, flatten the heads and hiss when annoyed.	Not poisonous, and not provided with teeth that could tear human flesh. Active only during the summer months.	Give off highly offensive odor, which may be a protection and may be means of keeping groups together. Undoubtedly have a sense of smell. In winter, coil together in numbers. Emerge early.
Undesirable in ponds where fish or waterfowl are being raised. Flesh makes excellent food in soups, and animals may serve as useful scavengers of waterways. Too dangerous to be considered as pets.	Probably undesirable except as scavengers and doubtfully valuable otherwise. Rather dangerous and offensive pets. Easily caught and not infrequently take hooks of fishermen.	Not a useful species because of habit of eating more useful toads and frogs, but make interesting, perfectly harmless pets and thrive well in captivity if fed sufficiently.	A most useful species. Make excellent pets and are entirely harmless and yet are frequently killed by persons who, in so doing, show their ignorance regarding the animals and of the rôle they play.	Not a desirable species economically, probably, but make interesting pets and are never poisonous, although individuals may, if disturbed, bite viciously though harmlessly. May tear skin with jaws but do nothing more.

NAME	WATER SNAKE *Natrix sipedon sipedon*	KING SNAKE CHAIN SNAKE THUNDER SNAKE *Lampropeltis getulus*	TIMBER RATTLE-SNAKE BLACK RATTLE-SNAKE *Crotalus horridus*	ALLIGATOR *Alligator mississipiensis*
DESCRIPTION	Length, to 3½ feet, tail being 8 inches. Light brown, with dark brown spots and bands across back; dark blotches on back alternating with similar areas on sides; sometimes uniformly brown. Color more brilliant after skin is shed. Scales, *ridged*.	Length, to 6 feet, about ⅐ being tail. Scales, smooth, in 21 to 25 rows. Black, usually with white or yellow, narrow cross-bands which may fork on sides and join one another. Bands separated by from 5 to 10 scales. Abdomen, black with yellow blotches.	Length, to 3½ feet, or, rarely, 5½ feet. Head, broad-diamond-shaped, with scales over top. Scales, in 23 to 25 rows, keeled. Pair of poison fangs on upper jaw. Color, yellow-brown with irregular cross-bands yellow with black spots. Tail, black in adult.	Length, to 14 or 15 feet, ½ being tail. Weight, to 500 pounds. May mature at 9 feet. Snout broad, not pointed like those of crocodiles, and do not show the 4th teeth as do the crocodiles. Teeth, 19 or 20 on each side of each jaw. Skin roughened and leathery.
HABITAT	In or near fresh water along lakes or in streams where food may be abundant.	On the ground in meadows and brushland, but more particularly in wooded areas.	Relatively common locally on exposed rocky ledges and undisturbed timber land that is not too wet.	In swamps and pools in the warmer parts of the country, but do not enter salt water as do the American crocodiles.
RANGE	Northern and northeastern United States and into southern Canada, being more common north of Kansas and North Carolina.	Southern New England to Florida, being more common in the south Atlantic States and west to the Mississippi, with related species westward.	Maine to Georgia and west to the Great Plains, with related species extending the range westward. Generally local, and common only in few places.	Rivers and swamps of the lowlands of the Carolinas, Georgia and Florida west to Louisiana, Mississippi and to the Rio Grande in Texas. North to Rodney, Mississippi.
CLASSIFICATION AND LIFE HISTORY	Class Reptilia. Order Squamata. Sub-order Serpentes. Family Colubridae. Young, born alive in late summer, in litters of from 16 to 44, become independent soon after being born. The families quickly break up.	Class Reptilia. Order Squamata. Sub-order Serpentes. Family Colubridae. Eggs, 10 to 24, laid in early summer on the ground or buried under trash and requiring from 5 to 6 weeks to complete incubation. Young shift for selves from the first.	Class Reptilia. Order Squamata. Sub-order Serpentes. Family Crotalidae. Young to the number of 7 to 12 born alive in September, each bearing a single button on end of tail. Skin shed once before first winter hibernation, starting the rattle, which increases one rattle every time skin is shed; possibly 2 to 3 a year.	Class Reptilia. Order Loricata. Family Crocodylidae. Mating males bellow and emit strong musk scent. Females lay 30 to 40 or more eggs in nests of decaying plants, which aids in hatching. Mother protects nest. Eggs, like long hen's eggs. Young, when hatched, 8 inches long, and weigh 1½ ounces. At 4 years, 5½ feet, 50 pounds.
FOOD AND BEHAVIOR	Food, largely fish, frogs and other aquatic life captured and eaten alive. Prey caught in mouth and not crushed by constriction of the body; may be bigger around than normal diameter of the snake. Protection by escape, by aggressive attitude, and inconspicuous appearance. Generally a nervous species.	Food, mostly rodents and snakes, all of which are captured and first killed by constriction and then eaten whole, unless they are too large. Apparently willing to fight most snakes, although do not go out of way to attack the larger ones. May easily kill snakes larger than they are themselves.	Food, essentially rabbits, mice, birds and squirrels, not charmed but paralyzed by poison, which is inserted when snakes strike. Rattles serve to warn other animals but not to charm them. Can strike only about ½ the length; tendency to strike varies greatly with conditions. Fangs shed each 3 months but renewed.	Food, animals, which are captured in jaws or knocked down by tails. Can move heads and tails sideways with great speed and force. Prey may be held under water to drown and then brought to surface and swallowed whole above the water. 10-foot alligators can swallow ducks whole. May make booming noises when capturing prey.
REACTIONS TO HEAT, LIGHT AND DISTURBANCE	Excellent sense of smell and of touch. Can remain submerged in water for considerable time. Active night or day but more at night.	Non-poisonous and immune to the poison of the poisonous snakes, which frequently bite them in combat. Emit a musky odor when disturbed and hiss warning.	Favor warm, sunny rocks. Poison affects the blood and may best be removed by suction devices, or counteracted by antivenom serums. Potassium permanganate useful.	Animals cannot survive low temperatures. May hibernate and aestivate 2, 3 or more months each year.
USE TO MAN AND ROLE IN NATURE	Probably not of use to man's interests since they destroy useful fish and frogs. Not poisonous, although may inflict unpleasant tearing of the skin since they strike violently.	Highly valuable as destroyers of rodents and of snakes that may be dangerous or be of little use. Make good pets because of docile nature once they have become accustomed to handling.	Useful animals as destroyers of mice and rabbits, but dangerous because of their bites, which only rarely occur. If one is bitten, circulation of poisoned blood should be stopped by any means known. Whiskey not helpful.	Hide valuable as a leather source, but the supply has been unwisely exhausted. Enemies of ducks and other useful water animals, but do not harm man normally and avoid him whenever possible. Should be protected from extermination.

TEXAS HORNED TOAD *Phrynosoma cornutum*	COMMON SWIFT FENCE LIZARD *Sceloporus undulatus*	CHUCK-WALLA *Sauromalus ater*	GLASS "SNAKE" JOINT "SNAKE" *Ophisaurus ventralis*	Gila Monster *Heloderma suspectum*
Length, 6 inches, about ⅓ being tail. Head, with large horns in rows and with eyes that close readily. Body, wide, flat, short, with a row of spines along sides. Tail, short, bordered with a row of spines. Gray, spotted with brown, with a middle yellow band.	Length, to 5½ inches, ½ being tail. Width, ¾ inch. Gray brown or green, black cross-bars like irregular V's. Pale bands from eye along each side about 10 scale-rows apart. Males, with black blotch under chin and 2 blue abdominal areas.	Length, to 1 foot. Body, broad. Tail, thick, flattened horizontally, stubby and under ½ total length. Head, about 1½ inches broad. Scales, small. Color of adults, dull brown, black or olive. Abdomen, reddish.	Length, to about 3 feet, about ⅔ being tail, which is brittle and easily shed. Since they have eyelids, ears and scaly bellies they are not snakes, but lizards without legs. Black, olive or brown with each scale with small green spots. Greenish white beneath. Glassy.	Length, to 24 inches; width, 4 inches. Tail, about ⅓ of the length. Legs, weak and sprawling. Head, heavy. Body, legs, head and tail covered with bead-like structures. Color, gray with irregular rose blotches. Poison fangs in the lower jaws.
Hot, dry, sandy wastes, particularly where the heat would seem to be practically prohibitive to animal life.	Dry, sandy pinelands, or other dry places, but prefer fallen woody plants, and especially rail fences.	Deserts of sand or in rocky areas.	Dry meadows and similar places where suitable food may be found.	In dry, desert-like lands, particularly where it is sandy and the soil loose.
From Kansas to the northern States of Mexico and west to Colorado and New Mexico, with related species extending the range.	Eastern United States from New Jersey to Florida, with closely related species extending range from Atlantic to Pacific coast north to Oregon.	Southern Nevada, southwestern Utah, Arizona, southern California and Lower California.	Southern United States from the Carolinas west through Tennessee, southern Wisconsin, and south through New Mexico and to State of Vera Cruz, Mexico.	Extreme southern Utah and Nevada; Arizona and Sonora.
Class Reptilia. Order Squamata. Family Iguanidae. Young, 6 to 12, born alive, or rather, in transparent envelopes that quickly break, freeing young, which resemble parents but possess undeveloped horns and lack general, spiny appearance of adults. Shift for themselves quickly.	Class Reptilia. Order Squamata. Family Iguanidae. Eggs, ⅜ to ½ inch long, oval, with thin, papery shells, which indent with slightest pressure; hatch at ordinary room temperatures if kept moist, but not wet, in from 6 to 8 weeks and into small lizards that resemble the adults.	Class Reptilia. Order Squamata. Family Iguanidae. Young, more olive than adults and marbled or spotted with black or with reddish bands mixed with yellow dots showing more distinctly on the tails. Males, more gorgeous than females. Known to mate in June or July.	Class Reptilia. Order Squamata. Family Anguidae. Story that glass snakes break in two to form two individuals, or that the parts come together to make single individuals, is not true. Some relatives of this lizard lay eggs.	Class Reptilia. Order Squamata. Family Helodermatidae. Eggs, 6 to 13, soft-shelled, 2½ inches long, buried to depth of 3 to 5 inches in damp sand, usually where it is exposed to the sun; laid in July or August; hatch in about a month, if kept moist, into 4-inch young more brilliantly colored than adults.
Food, largely insects captured on the run with wonderful rapidity. In captivity, thrive on mealworms and other insect larvae, cockroaches, grasshoppers, crickets and other relatively large-bodied insects. Protect selves by burrowing into sand, or by swelling, by threatening poses, or by expelling blood from eyes in streams.	Food, essentially small insects; in captivity, thrive on mealworms, cockroaches and the like. Protection, by speedy escape, by shedding tails if caught and by inconspicuous appearance. May be caught by means of horsehair nooses. Food captured by pursuit and held in mouths.	Probably, solely plant-eaters. Prefer buds and flowers, although sometimes eat leaves. Protection, by striking effectively with tails when teased, or by inflating bodies so that removal from crevices is difficult. Coloration provides protection. Hardy animals with many enemies. Locomotion, relatively slow.	Food, largely earthworms, slow-moving insects, slugs, eggs of small birds and other small forms of animal life; captured in burrowing and crushed by strong jaws. Protection by remaining hidden or by breaking in two. Enemies include snakes of some kinds and other animal eaters.	Food, in the wild possibly insects, such as ants and birds' eggs. In captivity, thrive on eggs, insect larvae and chopped meat mixed with eggs. Protection by remaining hidden. Can store food in tail, which is plump in well-fed animals and lean in those that have starved. Apparently enjoy hard-boiled eggs if these are broken up.
Definitely susceptible to the sun and to moisture. While they need water to drink, they avoid moist earth and respond quickly to direct sunlight and heat.	Favor an abundance of sunlight and must be kept dry in captivity. Have exceptional ability to see, and avoid capture, responses being almost instantaneous.	Favor sunlight and rocks that may be unbearably hot to human touch. Stick out tongues while walking, possibly as a sensory act. May become rigid if rubbed.	Loss of tail is voluntary, and it is replaced by a sac of flesh. Burrow a great deal, so cannot be said to favor strong light as do many lizards.	Becomes alert in the sun and sluggish when out of it. Apparently not much inclined to bite. Fond of water, despite its apparent immunity to drought.
Undoubtedly useful as destroyers of insects and other forms of animal life. Make excellent pets, but probably do not themselves profit by protection thus given them by man, and should not be kept captive unnecessarily.	Make interesting terrarium pets and serve a great usefulness as destroyers of insects. Do no damage and are entirely worthy of protection, which they do not often get.	Edible; formerly used as food by Indians. Flesh described as tender and palatable. Not known to bite even when roughly handled. Indians puncture inflated lizards with wire to remove them from rock cavities.	Of little economic importance, but of great interest because of habit of breaking in two. Can be easily caught but not easily found.	Probably of little economic importance in the wild, but of great scientific interest since it is the only poisonous lizard known, and because of the unusual location of the poison, which affects victim's respiration and stops urine secretion.

The Rôle of Reptiles in the Scheme of Things

THE term "reptile" is frequently too loosely used. Burroughs once commented on the reptilian qualities of a newt. Seton, in his story of the kangaroo rat, in *Lives of the Hunted,* describes and figures the amphibian, *Ambystoma* as a "ferocious looking reptile". Seton's treatment of the animal, which he encountered in a kangaroo rat's burrow, shows him to possess against the Amphibia and Reptilia the same prejudices that he deplores in others toward his beloved mammals.

To the layman, the important things to remember are relatively simple. Both reptiles and amphibians are, like the fishes, cold-blooded. That is, their temperature is that of their environment. The characteristic amphibian—such as a frog, newt or salamander—has a smooth, commonly moist skin, frequently slimy to the touch and scaleless. The reptile, on the other hand, has its body protected wholly or in part with scales, although in some cases these are leathery rather than horny, or absent.

Most reptiles come to the land to lay their eggs, while most amphibia go to water for this purpose. The reptile eggs are generally proportionately larger than those of the amphibia, and permit the young to develop sufficiently so that they resemble the adults at time of hatching. In some reptiles the young are held in the body of the mother until the time when they can begin an independent existence. Then they are born alive. The reptiles breathe only through lungs, while most of the amphibia breathe by gills when young, and usually throughout their lives.

The reptiles came into prominence on the earth towards the end of the Paleozoic era. The succeeding era, the Mesozoic, saw them supreme, so much so that the era is spoken of as the Age of Reptiles. During that period of time reptiles swam, flew, burrowed, leaped, climbed and walked. Today they do all of these things except fly. Our birds were developed from reptiles.

The best publicized of the early reptiles are the dinosaurs, whose skeletons and tracks are to be found widely over the continent. Some of these were probably the world's biggest land animals, while others were no larger than a sparrow. None are alive today.

Economically, reptiles of different sorts supply us with food, leather, oil and valuable checks on many of our enemies. Many of their kind are in danger of extermination over considerable areas through ignorance or unwise management. Our sea turtles, the giant turtles of the Galapagos Islands and many of our useful snakes will undoubtedly disappear unless they are given adequate and immediate protection. With chain stores and tourist stands selling young alligators, turtles, chameleons and horned toads the drain on the natural supply is terrific. The fact that some of the reptiles have food value does not seem to be able to keep them in check as is shown by the persistence with which snapping turtles retain the territory that is theirs. Neither does the fact that reptiles such as the snapping turtle may prey on ducks, fish and other species, claimed for their own by the sportsmen, seem to keep them in check. Bounties have been placed on their heads but still they are with us. On the other hand, certain states have laws protecting some species of food value, but even these have not prevented their practical extermination.

Not a few people make a living as collectors of reptiles of various kinds. These are sold to other collectors, to universities, museums and zoos. With some of the poisonous snakes, interest is so great that large institutions are maintained for the production of protective serums.

Reasonably careful studies have been made of the economic value of some of the reptiles that prey on rodents and other enemies of agricultural crops. One estimate is that a full-grown gopher snake on a midwest farm is worth about $40 a year because of the crop pests it destroys. Such a snake about a barn would be more valuable than a cat since it could and would pursue the pests into their holes where the cat could not possibly follow. Similarly, in the fields they can enter burrows that would be closed to other rodent enemies.

ACKNOWLEDGMENT

This article is a modification of a similar one by the author published as a number of the *Cornell Rural School Leaflet* by the New York State College of Agriculture at Cornell University. Modifications have been made upon reactions to that leaflet. Appreciation is expressed to the College for permission to revise this material, and to the books that were used to supplement the author's experiences with various reptiles. The illustrations are by Hope Sawyer and are copyrighted. The books most commonly used as references follow.

Reptiles and Amphibians; Their Habits and Adaptations, by Thomas Barbour, Houghton Mifflin Company, Boston, revised edition, 1934.

All About Reptiles (Including Frogs and Toads), by Walter S. Berridge, Robert M. McBride and Company, New York City, 1935.

Snakes and Their Ways, by C. Howard Curran and Carl Kauffeld, Harper and Brothers, New York City, 1937.

The Book of Living Reptiles, by Raymond Lee Ditmars, J. B. Lippincott Company, Philadelphia, 1936. (Juvenile)

The Reptiles of North America, by Raymond Lee Ditmars, Doubleday, Doran and Company, Garden City, New York City, revised edition, 1936.

Reptiles of the World, by Raymond Lee Ditmars, The Macmillan Company, New York City, revised edition, 1936.

Snakes of the World, by Raymond Lee Ditmars, The Macmillan Company, New York City, 1937 edition.

Reptiles, Amphibians and Fishes, by Charles W. G. Eifrig, Rand McNally and Company, Chicago, 1930. (Junior book)

Snakes Alive and How They Live, by Clifford Hillhouse Pope, Viking Press, New York City, 1937.

Animals in the Sun, by William Wilcox Robinson, Harper and Brothers, New York City, 1934.

Cold-blooded Vertebrates, by Samuel F. Hildebrand, Charles W. Gilmore and Doris M. Cochran, Smithsonian Science Series, Volume VIII, Smithsonian Institution, Washington, D. C.

Birds In Hand

Photographs by
Hugh M. Halliday

A pair of youthful wrens survey the world from a stump top. Below, a young bluebird is tempted by a meal worm and clings to the stem of Mr. Ivor's pipe. The wooded lane leading to the aviary and sanctuary traverses the growth that provides such a splendid habitat for the bird residents.

Many men and women have succeeded in winning varying degrees of friendship from wild birds, but few have achieved the close intimacy of H. R. Ivor of Erindale, Ontario. On four acres of natural wild habitat he and an interesting variety of birds make their homes. Equipped with government permits, Mr. Ivor has put all his assets into his Native Bird Research Foundation, established such aviary facilities as his funds now permit, and launched a worthwhile program of bird study.

It is Mr. Ivor's conviction that more absolute data may be obtained by working with birds in semi-captivity than in a completely wild state. Close study may be made of the home life of the birds, from the first building of the nest to the launching of the young. Exact data on time and duration of nest-building; nest materials used; relative expertness at building as between young and old birds; periods of incubation and growth of young; and many other facts, are thus obtained.

All captive birds are not given their liberty when nesting because a few species will desert the nest. The majority, however, are allowed to go and come as they wish as soon as the first egg is laid. A small opening is made in the aviary compartment where the birds are nesting, and if they are allowed to find this opening themselves they will use it to go out to seek food in the nearby woods and meadow, bringing it in to the young. In cases where the female alone sits during the incubation period, the male brings food for her, and when the young are hatched both parents seek natural food for their offspring.

All migrant species are moved from the outdoor aviary to the indoor bird room about the middle of October. Here they remain until the next nesting season.

Resident birds that can stand the winter outdoors remain in the aviary. Some use the shelter shed at night; others prefer the shrubs in the aviary.

Mr. Ivor has a remarkable ability at hand-rearing birds. Although this requires painstaking work and an intimate knowledge of the needs of nestlings, he feels that the information obtained in this way is worth the effort. Working with young birds, he gains a confidence like that they have in their parents. He thus is able to study individual characteristics; behavior between male and female; actions of birds of the same species at different times of year; behavior of different species; reactions of the aviary birds when strange birds of the same or different species are introduced.

Anyone visiting the sanctuary will be amazed at its owner's ability to call wild birds down to him. A call, and five or six blue jays will appear out of the trees. Rose-breasted grosbeaks and catbirds respond with similar enthusisam, Between forty and fifty pairs of birds nested on or near the Ivor four acres last year, most of them tame due to the rigid protection given them. During the winter a flock of birds, including chickadees, white-breasted and red-breasted nuthatches, blue jays and magpies (introduced from the West) accompany Mr. Ivor to the mail box.

Two pairs of blue jays have nested and reared families on the sanctuary. For all their bad reputation, they have never been seen bringing an egg or nestling of another bird to their own young.

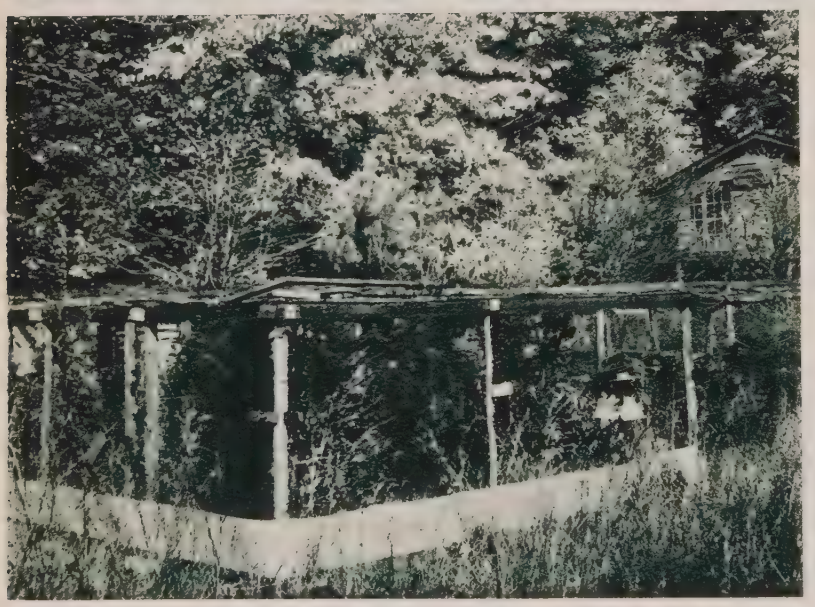
Young birds are brought to Mr. Ivor—some ill, some injured. Last year he lost not one such nestling. Although the keeper of the birds has only two or three exotics—his interest being in native birds —a European golden oriole is one of Mr. Ivor's proudest achievements. The bird was brought to him seriously ill. He nursed it back to health and it now will sit on his hand, happy at having its feathers stroked.

Mr. Ivor's chief problem now is inadequate facilities for his growing number of bird guests. He wants to build a new aviary over natural habitat where shrubs are now growing. This must be high enough to accommodate the growth and large enough to permit wire mesh compartments for timid or non-gregarious birds. The indoor facilities, too, are crowded and more space is needed for exercise.

At the top of this page is Mr. Ivor's picturesque woodland home, and, below, a corner in the aviary with a robin, two thrushes and a pair of evening grosbeaks at the feeding station. Left, an acre weed patch where juncos, snow buntings, tree sparrows, goldfinches and others feed. As many as five hundred have been counted at one time.

On the next page are, left, top to bottom, one of Ivor's pet blue jays; two peanut-loving cedar waxwings; a magpie that likes to have his throat rubbed; a male catbird. Right, top to bottom, a wood thrush, one of Ivor's closest companions; a robin with a fondness for elderberries; a young male rose-breasted grosbeak with similar tastes.

Some of the Ivor Guests



This orphaned short-eared owl was brought to Mr. Ivor in bad condition, but after two weeks careful attention and diet it prospered and grew up successfully.

At the left is a view of a part of the present outdoor aviary. Its facilities are limited, and a new aviary that is at least twelve feet high is badly needed. In order to maintain order and keep the birds contented, it is also necessary to provide for compartments for nesting.

For several years a pair of marsh hawks have nested near the Ivor sanctuary. These two young birds are from one of these nests and have been banded. Marsh hawks become quite tame when hand-reared, but once they start foraging for their own food they revert to wildness.

★ Conservation ★

A part of Nature Magazine each month is devoted to the expression of practical opinions on the vital issues affecting our use and abuse of natural resources, including wildlife, and dedicated to the purpose of assisting Americans to play a militant part in the attainment of constructive conservation aims.

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WILDLIFE ★ ★ CONSERVATION

House Report No. 1, 1st Session, 76th Congress, on Wildlife Conservation, committed to the Committee of the Whole House on the state of the Union, was made public early in January, 1939. It is a concise report of twenty-nine pages, based mainly on hearings conducted at various times during May, 1938, by The Select Committee on Conservation of Wildlife Resources, House of Representatives.

The committee's recommendations are summarized under eight headings, substantially as follows:

1. That additional funds for wildlife purposes be appropriated for the Biological Survey, the Bureau of Fisheries, and the Park Service.

2. That the excise taxes on arms and ammunition be continued, the full amount to be appropriated under the provisions of the Pittman-Robertson Federal Grant-in-Aid to States Act.

3. That a measure to accomplish the objectives of the Vinson bill be enacted, with provisions to meet the President's objections.

4. That the wildlife program of the Civilian Conservation Corps be continued.

5. That special emphasis be laid on the restoration and conservation of the nation's depleted fur resources.

6. That the seizure be authorized of automobiles, boats, guns, and other equipment used in unlawful taking of wildlife on Federal refuges.

7. That the Lacey Act be amended to remove the provision requiring specific listing of the contents of packages shipped in interstate and foreign commerce.

8. That in the promulgation of Federal shooting regulations for the 1939 season, consideration be given to permitting the use of a limited number of live-goose decoys.

With most of these recommendations we have no particular quarrel, although we question the principles involved in No. 2. Also, a rather careful search of the full report on the hearings fails to reveal the basis for the apparent loosening of restrictions recommended in No. 7. But we fail utterly to see how this committee could possibly justify recommendation No. 8. The prohibition of the use of live decoys in the taking of waterfowl was accomplished only after a bitter fight of several years' duration, in which the advocates of this practice invoked the use of every known artifice to insure its continuance. For many years the use of live decoys was recognized as one of the most dangerous contributions to exterminatory practices, and was properly condemned as unjustifiable from the standpoint of any reasonable code of sportsmanship. With its companion, baiting, its banning was accomplished only when several species of waterfowl were threatened with impending extermination.

Searching for an explanation of the willingness that this hard-bought gain be thrown in the discard by an organization assumed to be interested in preserving our wildlife resources, we find on page 24 of the report the following statement:

"It has been felt by many sportsmen and sportsmen's organizations of the country that the Federal regulations for shooting migratory birds were too drastic. That instead of safeguarding the birds they were promoting a widespread lack of law observance and consequently a greater loss of migratory birds. Full opportunity was given for discussions pro and con of this subject and a number of witnesses were heard during the 1937 and 1938 hearings. A questionnaire was also sent the game commissioners of each State to ascertain the attitude of State organizations on the question. Certain relaxations in the regulations for the 1938 season, especially the one permitting a possession limit of 20 migratory birds instead of the previous one day's bag limit of ten, have met with general approval among sportsmen. A plan has also been worked out whereby representatives of the States will meet annually with officials of the Biological Survey to discuss future regulations.

"After consideration of the evidence heard on the subject, particularly because of the fact that without the use of live decoys sportsmen in a number of States find it practically impossible to get any legal shooting, the committee is of the opinion that in the promulgation of Federal shooting regulations for the 1939 season consideration should be given to permitting the use of a limited number of live-goose decoys."

The main evidence that leads the committee to make this extraordinary recommendation seems to be found on page 232 of the hearings held by the committee on May 17, 1938. John C. Huntington, President of More Game Birds in America, and credited with the invention of "Ducks Unlimited", was speaking. In the course of his testimony he said:—

"We favor amendment of the regulation prohibiting the use of live decoys so as to permit the use of a limited number, say five, live goose or duck decoys. Without the use of live decoys, sportsmen in a number of states find it virtually impossible to get any legal shooting. In these localities, the prohibition of the use of live decoys has resulted in a tremendous wastage of ducks due to the fact that sportsmen have been shooting at very long range, crippling three or four birds for every one which they count in the legal bag. This regulation is an example of conservation in reverse." Comment seems unnecessary.

It is interesting to note also that Mr. Huntington on the same occasion recommended the resumption of baiting, and a thirty-day season spread out over a sixty-day period, and that a like-minded "conservationist", representing the Massachusetts Waterfowl Association, the same day advocated ten four-day weeks of shooting, and a flexible duck stamp that would allow the shooter to select his own time for hunting! A careful examination of the text of the 1938 full report also shows that, with the exception of the various governmental bureaus, no organization of national scope unselfishly working for wildlife improvement was represented at these hearings.

The report also furnishes an interesting sidelight on one type of method used to liberalize the waterfowl regulations. The chief of the Biological Survey was asked by a member of the Conservation Committee to comment on a bill just reported providing that a hunter may possess three days' limit of migratory birds at one time. Asked to comment, Dr. Gabrielson replied, "I am very much opposed to the bill." The member continued: "I might say the sentiment of the committee is overwhelmingly in favor of the adoption of such a modification of the regulations. . . . Do you not believe it would be good policy for the Bureau to work out something along this line rather than having a law passed that would regulate it? . . . What would you say, if the bill that was reported provided a two-day bag limit instead of a three-day bag limit?" Gabrielson still did not like it, and was surprised that the Bureau was not consulted. But a few weeks later we find that the Secretary of Agriculture recommended a possession limit of two days' bag.

We are not surprised at the attitude shown by this committee on this occasion, for it is not new. But we find it difficult to discuss such an attitude calmly. The administration of the Migratory Bird Treaty Act, for the *protection of the birds,* passed in 1918, was specifically charged to the Secretary of Agriculture. Almost immediately attempts were made by states and individuals to discredit the Act, and individual members of the Congress have been known on many occasions to threaten officials concerned with its administration. The constitutionality of the Act, however, has been repeatedly upheld by the highest courts.

We therefore consider indefensible the state of mind of a conservation committee that favors and recommends administrative regulations that are destructive rather than preservative. Such tactics seem to involve a serious misunderstanding of the real purposes of the Treaty Act. Surely an administrative officer of the Biological Survey has a right to expect cooperation, rather than opposition, from a congressional committee devoted to the conservation of our wildlife resources.

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PASS ★★ H. R. 4170

"It is my opinion that pending further experimentation with interstate and State enforcement activities, Federal participation in pollution-abatement should take the general form of establishing a central technical agency to promote and coordinate education, research and enforcement," said President Roosevelt in a special message to Congress on February 15.

He declared that "the time is overdue for the Federal Government to take vigorous leadership along these lines." The President urged a system of Federal grants in aid and "loans organized with due regard for the integrated use and control of water resources." He pointed out that public works programs and work relief activities have made possible advances in abatement of the situation, and added:

"As in many other fields of conservation, great improvement in the Nation's basic assets of water has been incident to the fight against unemployment. If this construction work is to continue at a substantial rate, and if the necessary research, education, and enforcement activities are to be carried out most effectively, the Federal Government must lend financial support and technical support."

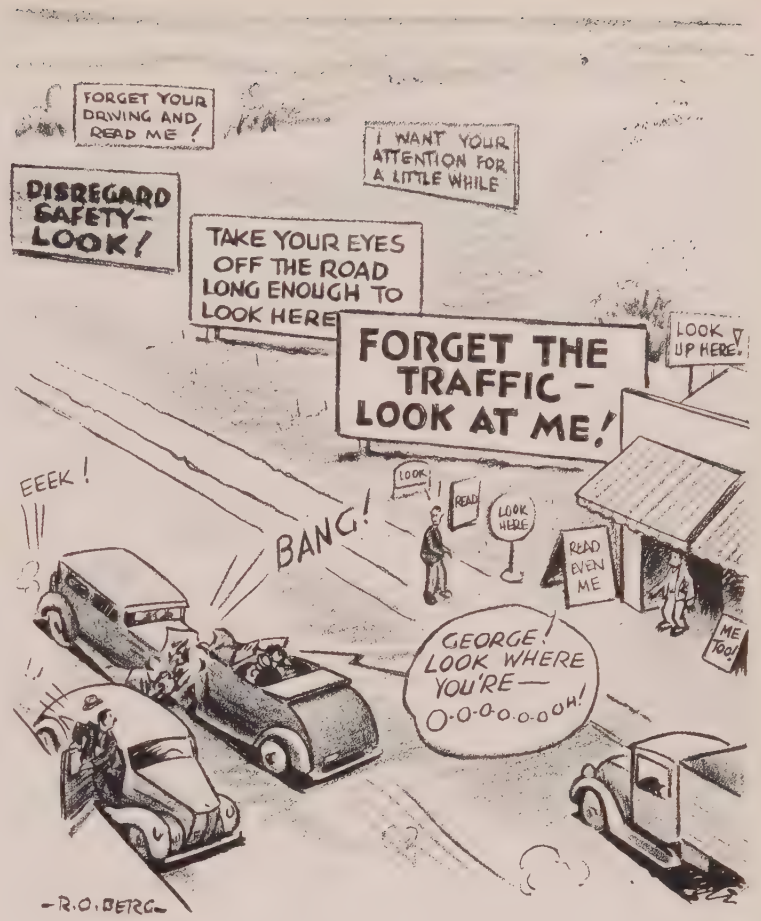
Of the several bills relating to abatement of water pollution and now pending before the 76th Congress, only one meets the President's request for enforcement. This bill is H. R. 4170 and was introduced in the House by Congressman Karl E. Mundt of South Dakota. This is the measure that should be enacted into law substantially as it is now written if we are to take any really effective steps to wipe out this evil. The other pending measures are gestures seeking to delay affirmative action.

Every American interested in the future of this country and its natural resources is urged to ask his Senators and Congressman to support H. R. 4170.

The Skids Are Greased

Public sentiment for billboard and roadside control is now at boiling point

By ARTHUR NEWTON PACK



WHAT THE SIGNS REALLY SAY

"BILLBOARDS properly may be put in a class by themselves", declares the Supreme Court of the United States. And the American people are rapidly reaching the point when they will say: "Class dismissed."

For many years the billboard blight grew more rapidly than the volume of aroused public sentiment against it. The balance is now changing with a vengeance. Taxpayers, resenting this parasitic growth on the highways—for which they have spent billions—are ready to do something about it. Public disgust at the innumerable cases of ruined scenery is coupled with the demonstrated menace of the billboard to safe travel at present high speeds. The distraction of attention, inevitable in reading the billboard's message, together with extreme danger at curves and intersections, figure importantly in the grave problem of highway safety.

Active opposition to the inroads of the billboards on our rural landscape is not new. It is about two decades old, but it has grown strongly and is now reaching its majority—and its voting age. During those twenty years the organized outdoor advertising industry has had every opportunity to avert strict regulation. Its policy, however, has been to divert opposition, and not to cooperate. It has drafted beautifully-worded standards of practice for public consumption and then forgotten them. It has laughed in the face of reasonable requests for self-regulation, and now weeps in the face of inevitable public regulation.

During the last twenty years a body of legal opinion and legislative precedent has grown up. Courts have upheld the right to tax and regulate the billboards; have recognized them as traffic hazards; have declared them inimical to property values; have pronounced them offensive esthetically. Legislation has made varied progress, the most being accomplished in Massachusetts and in California.

Against these developments the organized industry has fought without regard for public interest or opinion. It has exerted an influence with legislatures all out of proportion to its economic importance, partly because it has been able to place individuals and organizations in its debt through the donation of free space. An individual, the beneficiary of free political advertising, for example, becomes an apologist for the billboard. A civic organization that has gratefully accepted free space to publicize some worthy project is not likely to be found arguing for regulation before some legislative committee. The industry has been clever according to its lights, just as the liquor industry before prohibition was clever. But disdain for the public interest brought prohibition (and there are some who detect a return of that disdain), and an identical attitude will bring severe regulation of outdoor advertising. In fact, it is likely to be more severe than if the billboard industry had been wise instead of clever.

The rolling snowball is an old metaphor, but a good one. The snowball of public indignation and action has reached a surprising size in the last year. As 1939 opened there was more widespread and varied evidence of action than ever before.

When people at random were asked how they felt about the rural billboard and the sad state of thousands of miles of our roadsides, a frequent response was, "Yes, it's terrible, but what can you do about it?" These people are now learning that they can do something about it. Two fine articles in successive issues of *Reader's Digest* surprised many of them, judging by the splendid response.

The Saturday Evening Post told others, and editors of other periodicals, recognizing the smouldering public feeling, are following their lead with practical discussions of the subject.

In the past many newspapers and magazines have hesitated to speak out against the billboards only because they did not wish to be accused of fighting a competitive advertising medium. Whenever possible the billboard industry has grasped the opportunity to impute such motives to publishers. The editors of the successful *Reader's Digest,* however, have a sensitive finger on the pulse of public sentiment, and, since they carry no advertising, there can be no charge of ulterior motive for the billboard folk to use as an alibi. The wise editor, however, keeps abreast of the times, and if his readers want advice and help in meeting the problem of roadside improvement he will give it to them. This education of the public through the pages of magazines with large circulation is one of the most important current developments. And there is more to come.

This year has witnessed the appearance of a number of important and practical aids to those leading the fight for improvement. Following the meeting called late last year by the National Roadside Council, the Conservation Committee of the Garden Club of America, the Roadside Development Committee of State Garden Clubs, and the American Planning and Civic Association, the latter organization has brought out two valuable booklets. One is a bulletin summarizing the discussions and conclusions of this meeting. The other is entitled *Roadside Improvement,* and discusses the general situation, suggests specific legislation, and presents a compilation of existing state laws regulating outdoor advertising.

Physically and textually, perhaps the most effective publication yet produced to show the billboard evil comes from New York. It is entitled *The Billboard,* with a subtitle, "A Blot on Nature and a Parasite on Public Improvement." This fine presentation is issued jointly by Frederick Stuart Greene, State Superintendent of Public Works; Robert Moses, New York City Commissioner of Parks; Lithgow Osborne, State Conservation Commissioner, and Rexford Tugwell, Chairman of the New York City Planning Commission, in cooperation with the New York Roadside Improvement and Safety Committee, of which Richard A. Douglas is Chairman.

From the National Roadside Council comes other helpful material in the form of advice on how the individual may help, and an analysis of court decisions upholding regulation of outdoor advertising. Also Mr. and Mrs. W. L. Lawton of the National Roadside Council, pioneer leaders in the battle for billboard regulation, are completing a careful study of progress in New England. This will be published by the American Nature Association, as one more in the long list of surveys and studies in this field of roadside development.

In presenting a "progress report" such as this, covering so many factors, one must skip about. We must not, however, overlook one human factor in the opposition to roadside conditions of today. For some time the outdoor advertising industry delighted to sniff at its opponents, declaring, "Oh, it's a women's movement." To an extent, and on the surface, it was, although with much quiet support by the men. Today there are active as many men as women. Ninety percent of the hundreds of responses to the *Reader's Digest* articles were from men. Members of state planning boards; highway and safety authorities; landscape architects and engineers; lawyer, doctor and, even, merchant chief, have joined the drive against roadside ruination. But the women did dig the cellar and build the foundation, and a fine job it was.

New York State is, at the moment, a particularly important battleground. The committee that brought out the splendid educational booklet, *The Billboard,* also proposed legislation. Governor Lehman, in his annual message to the Legislature, made a special plea for State control of highway billboards. Thousands of citizens of the State have put their signatures to petitions insisting upon their rights "to the fullest possible measure of highway safety unimpaired by the distraction of outdoor advertising, and to the enjoyment of scenery unimpaired by billboards."

Also in New York State an important issue is being fought under the Conservation Act protecting the Adirondack Park. Billboards are banned by the law but many were illegally erected, largely by individuals. Through cooperation with the owners most of these were removed,

THE COURTS HAVE SAID

"If the city desires to discourage billboards by a high tax we know of nothing to hinder . . ."

"The commission [Massachusetts] believed that billboards and other advertising signs, as thus commonly placed along the highway, were to a greater or less extent distracting, and were, therefore, traffic hazards . . . I find such restrictions tend to promote safety."

"It does not appeal alone to the desire or consent of such persons: it is forcibly thrust upon the attention of all such persons, whether willing or averse. For such persons who strongly wish to avoid advertising intrusion, there is no escape; they cannot enjoy their natural and ordinary rights to proceed unmolested. Such advertising has certain features attached to 'hawking' goods—a business long subject to regulation."

"Grandeur and beauty of scenery contribute highly important factors to the public welfare of a State. To preserve such landscape from defacement promotes the public welfare and is a public purpose."

"In a neighborhood of homes such commercial intrusions are offensive to the sight and obnoxious to ordinary, reasonable persons who may own or occupy these homes. . . . The introduction of signs and billboards into such neighborhoods tends seriously to injure and depreciate the value of the property."

"It must, in our opinion [Massachusetts Supreme Court], be regarded as settled by these decisions of the Supreme Court of the United States that billboard and like advertising devices upon private property have such demonstrated potentialities for harm to the general welfare that they may be prohibited in certain localities by public authority."

but the owner of one fur farm refused to act, holding the law unconstitutional. Litigation has dragged on after the fashion of most litigation in which billboard interests are involved. The importance of this decision rests on the right to control the signs on esthetic grounds. Another crucial legal battle is being fought in California.

LITIGATION NOW REVOLVES ABOUT THESE LANDSCAPE "DECORATIONS"
Adirondack Park is by law protected from billboards, but one user is attacking the law and continues to blot the landscape in the manner shown in these two pictures

Although we come to it last, certainly not the least important item of progress is in the field of legislation. Several strong state bills have been introduced in legislatures in session this year, that in Connecticut being one of the strongest and most important. In the legislative field, however, suggested laws drafted and presented for consideration by both the American Automobile Association and the American Planning and Civic Association are especially significant. The importance of both these organizations in their respective spheres of influence will bring much attention to both these proposals.

While both of these proposed laws are based upon long study and discussion, they are offered somewhat tentatively and as a basis for further discussion. Under both bills a strip one thousand feet back from the highway on both sides would be placed under the control of the state highway department, or other similar state agency. This is, in effect, strip zoning, and if it were enacted into law in every State would mark a long step forward. Both bills also seek by their terms to achieve the long-sought goal of restricting outdoor advertising to commercial districts and to restrict the development of roadside slums.

Enactment into law of either of these bills, even as now proposed, would greatly improve the existing situation, but what has already been accomplished through legislation and through court rulings indicates that both bills could go further than they do with every assurance of success. It is often better strategy to seek more than you hope to get from Legislatures than it is to ask for something mild in the hope of getting it through. The growth of public support of the need for billboard regulation indicates no excuse for an inferiority complex about such legislation.

In the A. A. A. Bill the definition of a commercial district is weak. This weakness may, in fact, easily become a menace to progress because of the very importance of its sponsors. In Connecticut, for example, the pending bill contains a strong and proper definition. Yet we may be certain that the billboard industry will cite the A. A. A. definition as a model, drafted by experts. It falls far short, also, of some California county zoning ordinances with respect to commercial districts. As this bill now stands a quarter-mile stretch of highway with ten residences on one side, four of which offer "Rooms for tourists", would be classed as commercial. The opposite side of the road might be entirely free of buildings, even offer a scenic view or a picturesque countryside. This provision could easily be changed to except certain uses and include the provision *"Exclusively* for business".

Again failing to take advantage of progress, both bills legalize existing signs without sufficient regulation to protect safety of travel. Set-backs proposed are much less than those established in the existing Massachusetts law or asked in the proposed New York law. Such set-backs are an important safety consideration.

It is unfortunate that neither of these proposed laws takes advantage of the repeated assertions of the Supreme Court that the billboards are in a class by themselves and do not, necessarily, have to be admitted where other business exists. The industry hates this principle, but it has been established by the application of rural zoning in California. The A. A. A. bill is entirely built on the assumption that billboards *are* like every other business use and entitled to the same regulations. The billboard industry will like this and we doubt whether they will offer any really active opposition to the Automobile Association proposal, although they fight any regulation.

In meeting the problem of the rural billboard we should recognize that the progress in sentiment and in precedent that we have already made toward the goal admits of no turning back. There should be no concession to an industry that has consistently refused to concede anything itself.

Things to Think About

Among the first national advertisers to recognize the growth of public sentiment against the rural billboard are the manufacturers of foodstuffs. Many of these have avoided this medium and others are leaving it. Latest recruit to the ranks of enlightened advertisers is the Rumford Chemical Works of Rumford, Rhode Island, which will do no billboard advertising.

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Acquisition by the Biological Survey of 18,219 acres to be added to twenty-one wildlife refuges in eighteen states has been approved by the Migratory Bird Conservation Commission. The largest addition is 6,180 acres to the White River Migratory Bird Refuge in Arkansas. Another is 2,508 acres added to the Delta Refuge in Louisiana. Additions of more than a thousand acres were approved for the Rice Lake and Tamarac Refuges in Minnesota; the Hart Mountain Refuge in Oregon, and the Bombay Hook Refuge in Delaware.

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Approval of the purchase of 290,203 acres within 49 National Forests has been given by the National Forest Reservation Commission. These additions, at a cost of $1,415,568, would add 70,623 acres in the Appalachian area; 37,379 acres in the southern region, and 153,626 acres in the Central and Lake States.

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Just before the January first deadline, 89 PWA projects, involving the expenditure of allotments totalling $2,090,500 in National Parks and National Monuments, were approved. These funds will be devoted to "physical improvement" and "modernization" of these areas, and are, according to Secretary Ickes, "for the convenience of the millions visiting the parks and monuments annually." Out of this fund Old Faithful in Yellowstone Park is going to have itself a better water, sewage and electric system.

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Under the budget provisions submitted to the 76th Congress only one million dollars would be available for cooperative wildlife conservation work with the states under the widely-hailed Pittman-Robertson Act. This law provided for the use of the revenue from the ten per cent tax on sporting arms and ammunition for such conservation activities. The tax amounts to about three million dollars a year. It has, of course, always been our opinion that such legislation is unsound in principle because it tends to increase, rather than diminish, the amount of arms and ammunition used to destroy wildlife, and also operates to prevent closed seasons, even when vitally needed, because of the loss of revenue involved. In this it is similar to the duck stamp and the prevailing system of supporting state fish and game work from license revenues. We have never been able to see any soundness in a policy based upon selling more means of destruction and more licenses to destroy, in order to obtain funds for restoration, particularly since restoration lags far behind destruction. Until the law caught up with him, Charles Ponzi found it easy to take money in faster than he paid it out, but we can't afford to pay out our wildlife resources faster than Nature can produce them. Supporters of this policy feel that if money was not obtained in this way it would not be obtained at all. There would seem to be no valid reason why the concerted support of honest sportsmen and sincere conservationists could not demand even greater appropriations from public funds. And now, if the Budget Bureau and, perhaps, Congress, does "short-change" the Pittman-Robertson Act by lopping off two-thirds of its promised revenue, perhaps public opinion will be helped to realize the loose thinking that lies back of the whole idea. Perhaps, also, it will be a step toward proper support of wildlife resources that are the property *of* all the people from funds paid in taxes *by* all the people.

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Under the title of *Oregon Looks Ahead,* the Oregon State Planning Board has submitted a report to the Governor condensing a summary of the resources, opportunities, problems and needs in the conservation or development of the natural resources of that State. Covering a broad field, this report is capably presented but is necessarily general rather than detailed in character. It is, however, a valuable "stock taking" and a guide to deeper study of the many issues involved.

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Indications of the "toe in the door" calculated to swing wide the portals to the return of the use of live decoys in shooting migratory waterfowl is to be found in the report of the Select Committee on Conservation of Wildlife Resources of the House of Representatives. To wit:

"After consideration of the evidence heard on the subject, particularly because of the fact that without the use of live decoys sportsmen in a number of States find it practically impossible to get any legal shooting, the committee is of the opinion that in the promulgation of the Federal shooting regulations for the 1939 season consideration should be given to permitting the use of a limited number of live-goose decoys."

This matter is discussed in greater detail on page 217.

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Under Wisconsin law every licensed hunter must make a report of the individual game kill. Failure to do so means that the licensee shall not be granted a license for one year. There were 237,000 licensed hunters in Wisconsin in 1938. With the deadline for filing a report as February 1, only about 9000 reports had been filed on January 19.

To encourage cleaning up farm woodland on which trees were blown down during the hurricane, the AAA has announced payments of four dollars an acre—with a maximum of sixty dollars for any one farm—in New England and Long Island. It is estimated that the storm blew down four billion board feet of timber, which is about eight times the average annual cut in New England. A serious fire hazard exists as a result, and the payments are designed to reduce this and aid in the restoration of the economically important scenic and recreational values of the area.

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Groups of conservationists and bird lovers in Great Britain are united in a battle for a law to prohibit the sale of the plumage of birds, and of dead birds, designed for millinery and other decorative purposes. Importation was prohibited by law in 1921, exception being made in the case of plumage already in the country at that time. Smuggling continues, however, and the fight is now centered on banning sale, to the end that the birds of the world may be preserved from massacre for fashion. This is an international issue and of interest to all conservationists.

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Five thousand, one hundred and twenty-eight residents of Westchester County, New York, joined in petitioning the Legislature to recognize by legislation "the rights of the people of New York State to the fullest possible measure of highway safety unimpaired by the distraction of outdoor advertising, and to the enjoyment of scenery unimpaired by billboards."

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A CONSERVATION TEXTBOOK

We heartily recommend to school authorities anywhere who are looking for a textbook to be used in conservation or social science courses, *Conservation of Renewable Resources* by E. M. Dahlberg. Here is a book written by a teacher and conservationist, which is an extremely rare combination. Here, too, is a book that has shorn much that parades as conservation of its false whiskers, and tells the truth about the past and present of our organic natural resources.

Mr. Dahlberg is a former member of the Wisconsin Conservation Department and has taught conservation as a part of high school biology work for more than twenty years. He lives in Ladysmith, Wisconsin, and we hope that his book will be adopted as a text in every school in his State—a State that requires by law that conservation be taught in all public schools. However, this present volume is not limited in its scope by State boundaries, and would be valuable in any school, particularly in the northern tier of States from coast to coast.

The strength of Mr. Dahlberg's book lies in an intimate knowledge of the outdoors, of hunting practices, of wildlife and the woods, and of the history of the conservation movement. Such conservation texts as have appeared have too often been the result of compilation of indoctrinated material from prejudiced sources, whether official or private. Mr. Dahlberg, by virtue of his background, is able to evaluate such material. He wisely says:

"Because of the extraordinary public favor enjoyed by the idea conservation, the term has been subjected to much fraudulent and unethical use. Practices that are completely the opposite of conservation have prospered because they have the protection of the conservation title. Promises are poured out by political candidates on conservation platforms without the least intention of ever putting them into practice. Organizations that destroy much more than they restore of the wildlife resources freely assume the name of 'conservation' club or association. So it is always well to examine the policy and practice of these so-called conservation movements to determine whether they are genuine or false."

We commend particularly to the attention of teachers Mr. Dahlberg's analysis of the results of the license and bounty systems; his discussion of the causes that have contributed to the destruction of our bird life; the results of the introduction of foreign species; forest conservation in general. And we also commend his dedication of his book, which is "to the memory of my Father and Mother who brought me Conservation lessons from Sweden and Denmark." It is not captious to observe that what weakness there may be in Mr. Dahlberg's book lies mainly in assumption of too great a background of conservation knowledge on the part of teachers using it. This is, of course, natural in one with the author's experience. Now and then, also, Mr. Dahlberg might strengthen his text by supplementing criticism of the past with constructive suggestion for the future.

Conservation of Renewable Resources is published by the C. C. Nelson Publishing Company of Appleton, Wisconsin, at $1.00, and probably a lower price in quantities to schools.

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Resolutions adopted at the meeting of the National Wildlife Federation included a demand that, before the construction of large dams, a thorough study be made of their effect on aquatic resources, as a basis of proper evaluation of the project. The resolution pointed to the fact that aquatic resources have been destroyed or seriously endangered by the construction of the Grand Coulee Dam in Washington, the Shasta Dam in California, and the Santee-Cooper project in South Carolina.

The Federation also approved the Missouri River diversion project, diverting the waters of that river into the James and Cheyenne Rivers, and, also, the restoration of Devil's Lake, in the Dakotas, as a means of restoring environment for migratory waterfowl. These activities, it was pointed out, will safeguard the refuges established in that region by the United States Biological Survey.

Another resolution supported the Prairie States Forestry Project of the United States Forest Service establishing farm shelterbelts and aiding restoration of wildlife habitat.

Native Trees for Home Use

By VICTOR H. RIES

HONEY LOCUST IS GOOD EXCEPT FOR ITS THORNS

Here it is effectively planted to supply shade for a patio garden. In the Ozarks a variety is found without thorns, and it is available from some nurserymen

HUMAN NATURE throughout the ages has always demanded exotic things—foods, textiles, art objects, garden flowers, and even shade trees. With shade trees, however, our native ones are, all in all, the most satisfactory, although some fine introduced ones are being successfully used.

If we are to use our native trees for ornamental plantings along our streets, around our homes, in our parks and in our recreation areas, where are they to be obtained? In general the most satisfactory trees will be obtained from the nurseries. There they have been grown under more nearly ideal growing conditions, have been properly cared for by root as well as top pruning, and, even more important in many instances, especially desirable types have been selected and propagated. Those living in less densely-populated areas, however, may often obtain satisfactory trees from local fields and fence rows. Most people seem to turn to the deep woods for such trees. This is the worst source, for, due to competition with other trees, they will have less desirable root systems, will be more difficult to obtain, and usually will have less desirable habits of growth.

Let us suppose that we have just purchased a new home and desire to plant some trees. The first question is when to plant. With few exceptions, they may be planted in either fall or spring. Thin-barked trees such as the flowering dogwood, redbud and white birch, if fall-planted, are often likely to be winter-injured. Trees with relatively fleshy roots, such as the tulip, the cucumber and other magnolias, should also be spring-planted. In fact this latter group seem to give best results if planted in the late spring when the leaf buds are starting to open.

You may have the experience of others about the time your house is completed. A man will appear at the door with a truck on which he has three or four trees. He will offer to sell them to you at an absurdly low price, including the planting. The trees, as they lie in the truck with their roots exposed, usually have a good-sized trunk and ample height, but, all too often, inadequate root systems. Whether you purchase a tree from a nursery or collect it from the field, it should have at least one foot of root spread for each inch of trunk diameter. In other words, a tree with a trunk three inches in diameter should have roots that measure at least a yard across. Not only this, but the bark on the trunk should be uninjured and unbroken, for it is the inside layer of the bark that is so vital in conducting the manufactured food from the leaves back down to the roots. Without this supply of food, the roots will soon starve to death and that of course kills the tree.

So look the bargain trees in the roots. And remember in selecting a tree, whether from the nursery or the wild, to choose one that, aside from having a fairly good shape and habit, has been growing actively for several years. A five-year-old tree with a one-inch trunk would be far more desirable than a ten-year-old stunted to the same size. The larger the tree the more important this point is.

How large a tree can you transplant? The limit of this is determined by the equipment of the local tree-moving man and your pocketbook. With adequate equipment, it is nothing to move a tree with a twelve- to eighteen-inch trunk. A tree with a four- to six-inch trunk is more or less child's play to the professional tree-mover.

A few precautions are necessary in planting trees, besides

having a tree in good condition. It is important that the soil where they are planted be well drained. Even a tree obtained from swamp land needs drainage to become reestablished. A line of agricultural drain tile to carry the excess water into another drain, or to a lower part of the yard, is important, especially if the trees have a trunk an inch or more in diameter.

Another thing to guard against is smothering the roots and retarding new root development by planting at a depth greater than that of its original home. The development of new roots may be greatly aided by planting in a pocket of good top soil. A light sandy loam is preferable to a heavy clay.

ELMS ARE FIRST FAVORITES

However, the Dutch elm disease and other elm diseases are locally prevalent and make planting a risk

The heavy loss usually encountered in newly-planted shade trees is absolutely unnecessary. If, after planting in a well-drained place at the proper depth, the trunks are wrapped with a layer of burlap or tree wrapping paper from the branches down to the ground, the usual sunscald and infestation of borers may be entirely prevented. Three guy wires on all trees more than two inches in trunk diameter are excellent insurance. The old theory that trees should be planted in exact relation to the point of the compass at which they were originally growing has long since been disproved.

Strangely enough, many gardeners feel that after they have gotten a nice-sized tree they should reduce it to the proportions of a clothes post by cutting off most of the top and most of the branches. This is, of course, absurd. With an adequate root system, the removal of more than a third of the leaf area by pruning the smaller branches will retard the tree's growth.

Which of our native trees should we select? The first one that usually comes to mind is the American elm. Unfortunately it is now beset in the vicinity of New York and New Jersey with the Dutch elm disease. Although governmental agencies are reducing the danger planting elms involves a risk. Through the Ohio River Valley two or three other elm diseases have been giving trouble the last few years, with one—known locally as the "Dayton Jitters"—assuming serious prevalence. All these ailments, once a tree is infected, can be controlled only by destruction of the tree.

Our next best choice, without question, would be one of the oaks, a large family with many possibilities. However, those oaks belonging to the white oak group, with the rounded lobes to the leaves, are unfortunately difficult to transplant. Consequently we had best confine our attention to the oaks with the pointed leaves. Of these the outstanding three would be the pin oak, the red oak and the black oak. There may be other oaks of local range, such as the laurel oak and the chestnut oak, that may be used. The oaks are not such slow growing trees as many think. In general they will outgrow a hard maple. For beauty, dignity and long life, oaks have no equal.

Among the maples we certainly would not want to select that all too much used soft or silver maple which, although fast growing, is too soft of wood and too brittle for convenience and safety. This leaves us the glorious sugar maple, and another—escaped in some sections—the sycamore maple. Both of these are excellent trees in those localities where the soil is adapted to them and where summer drought is not prevalent. For brilliant fall color a smaller maple that is sometimes used is the red maple.

If it were not for its thorns, the honey locust would be one of our most satisfactory trees for street and lawn use. Oddly enough, in the Ozarks a thornless form is obtainable, and these have been nursery-propagated. On the other hand, our common black locust, although often living to a ripe old age, is to be recommended only for planting on banks and waste places, because of the ever-present locust borer.

A relative of the elm that makes an effective tree, despite the witches brooms that it usually harbors, is the hackberry.

For those who are willing to take precautions in planting, the sweet gum, with its beautifully cut leaves, and the sour gum or tupelo, with its plain leaves, are both worthwhile. They give us some of our most brilliant autumn color. Since neither one of these is especially easy to transplant, they should always be handled with a ball of earth, which means they must be nursery grown.

There is no grander tree than our native sycamore, or plane tree, with its light-colored, spotted bark, and its majestic, gaunt branches in winter. It seems to be at home in low ground or high ground. Unfortunately, in some sections of the country, a fungus disease attacks the foliage as it comes out in the spring. Although this is seldom serious, most people blaming it on frost injury, it occasionally occurs later on during the summer.

One of the magnolias—the cucumber-tree—is too often

unknown. With a rather bold habit of growth and large leaves, it seems to lend itself rather well to cultivation, withstanding surprisingly low temperatures, unlike most of the other large-leafed magnolias of our southern states. It should be spring-planted with a ball of earth.

Sentiment in Ohio influences many to plant the buckeye. Like its European sister, the horsechestnut, it unfortunately has a serious leaf disease that can be depended upon to attack the foliage and disfigure it every summer. Consequently it is not to be recommended.

The basswood, or linden, includes a number of fine forms, and, if we will be careful to wrap the trunks to prevent sunscald, will make satisfactory trees. In general most people prefer the smaller-leafed forms. They are remarkably fast-growing trees. The delightful fragrance from the blooms is enjoyed by all each spring.

Although many are tempted to use our American beech, they find as a whole that the beech more or less resents cultivation. If a beech is to be planted the European beech has a foliage preferable to our own.

Most of the poplars are to be avoided because of their fast-growing, brittle wood. But one introduced European, the silver poplar, does produce majestic old trees. Unfortunately it does put out suckers profusely, although these can easily be kept under control with the lawn mower.

As a rule the nut trees, such as the walnut, butternut and hickory, are more of a nuisance than they are worth, unless planted in some grove where no lawn is mowed.

WINTER OR SUMMER, DOGWOOD APPEALS
Whether in bloom, fruit, fall color or bare, it is a small tree of dignity and charm

The white birch, although wild in many sections of the country, is ordinarily all too short-lived under cultivation due to the attacks of the bronze birch borer, for which as yet we have no control. Here again most people prefer the cut-leaf European weeping birch to our native one.

There are a number of small trees that can be used among the shrubbery plantings for flowering or fruit effects. Some of these, such as the flowering dogwood and the redbud, are well known, but not so well known and appreciated is the flowering crab. Unfortunately difficult to transplant, it is worthy of more effective use. Like the redbud and dogwood, it should be balled and spring-planted. Throughout the woods of many sections of the country we find a dainty little tree with bladder-like seed pods, the bladdernut. Throughout our fields and meadows and on our hillsides we find many forms of hawthorns, some of which are more desirable than others. These also require balling to transplant successfully. Along our fence rows and on our hillsides our native sassafras and staghorn sumac may be obtained to be tucked into odd corners of our gardens where we wish a taller screen planting and a brilliant bit of autumn color.

And so we see that, using our native trees alone, we have almost any size, habit of growth and type of foliage we desire. We can get those that give us brilliant autumn colors; those that produce showy bloom; those with fragrant bloom. Many produce decorative fruits. But for successful results we must obtain healthy trees, transplant them carefully and care for them intelligently.

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As the Storm Rides In

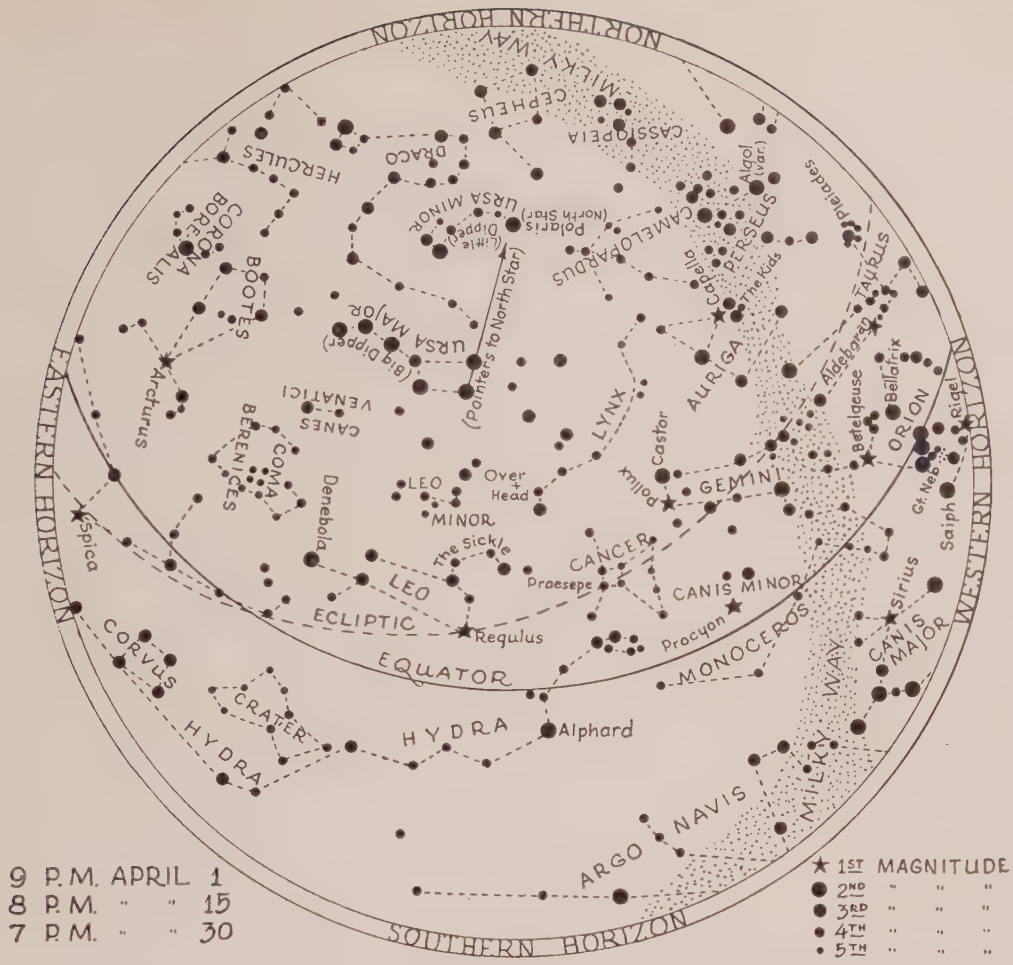
By LILLIE SOULLARD WEST

Little waves and schools of minnows
Swarming in upon the tide;
Flaws of wind make spreading winnows,
Sparkling ripples, as they ride.

Gray the river, gray the sky is,
Dark and lowering, overcast;
Steely lights—the wind so high is—
Scudding clouds that hurry past.

White-caps toss upon the river;
Swift the storm is driving near.
Lightning forks that flash and quiver,
Thunder follows sharp and clear.

Feel the sudden hush upon us;
Breathless, just before the storm.
"Make your peace!" it seems to warn us;
Dark on land and sea takes form.



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south.

The Discovery of a New Comet

By ISABEL M. LEWIS

ON THE night of the nineteenth of January a well-known amateur astronomer of Delphos, Ohio, by the name of Leslie C. Peltier, discovered his seventh comet in a period of over twenty years. As is the usual procedure in the United States when one is so fortunate as to find a new object in the heavens, Mr. Peltier lost no time in telegraphing the position of the comet and its brightness, which was of the eighth magnitude, to the Harvard College Observatory, at Cambridge, Mass., clearing house for astronomical news in this country. Dr. Shapley, Director of the Harvard College Observatory, in turn, sent this information to observatories in this country and to the Bureau Central Des Telegrammes Astronomiques of the Union Astronomique Internationale at Copenhagen, Denmark, which performs a similar service for astronomers abroad. It was soon to be found that Mr. Peltier must share the honor for the discovery of a new comet with a Russian astronomer, Prof. Cosik, of the observatory at Taschkent, U.S.S.R., who had observed the same object on January 17, and had communicated the news of the discovery to Prof. Beljawsky, Director of the observatory of Pulkowo, who had then obtained an observation of the comet several hours before it was discovered by Peltier. This information, as well as the announcement of the discovery in the United States, was sent forth from the Central Bureau at Copenhagen on January 21, and also the information that the object was diffuse, with a sharp nucleus and a tail less than a degree in extent.

Astronomers at many observatories at this point undertake a search for the comet in the approximate position announced by the discoverer. If the comet has moved considerably in the meantime, or there are clouds to interfere with observing, there may be difficulty in finding it, or it may even be lost altogether, especially if it is close to the sun at the time of discovery. If the comet is found, as accurate a measurement as possible is made of its position in the heavens and this information is also telegraphed

to the Central Bureau at Copenhagen, and in this country to the Harvard College Observatory, which again communicate this information to astronomers by telegram or announcement cards. As soon as three positions of the comet are available—and three are essential for the determination of a preliminary orbit of the comet—the orbit computers are ready to make the calculations that will give the path of the comet through the heavens, the size and shape of its orbit, whether it is moving in a parabola, and will make only one visit to the sun, or in an ellipse, in which case it is a periodic comet and will return after a certain interval of time, which can be determined. It is usually only a matter of a few hours' work for an experienced orbit computer to obtain a preliminary orbit and a "search ephemeris" that will enable observers to pick up the comet easily with their telescopes, and follow its course for several weeks or so before a more accurate path must be calculated. Within a day or so from the time when three positions of the comet have been obtained, several independent calculations of its orbit are usually telegraphed to the Harvard College Observatory, or, abroad, to the Central Bureau at Copenhagen. When a number of positions of the comet have been obtained different computers will frequently not use the same ones, but if the observations have been accurately made the results should be in good agreement.

In the case of the comet discovered this January a Harvard announcement card of January 23 gave six positions of the comet. On the next day another card gave the first two orbits that had been received. From these one gathered the information that Comet Cosik-Peltier, or Comet 1939 a, indicating by the letter used that this was the first comet discovered in 1939, was to pass perihelion, or the point in its orbit nearest to the sun, on February 6, when its distance from the sun would be about 67 million miles. A preliminary search ephemeris was also given, which showed that the comet in the next three weeks would pass from the point where it was at time of discovery, in the northwest corner of the constellation of Pegasus, in a southeasterly direction through Pegasus and Cetus, and would be visible during February in the western evening sky, but telescopically only. On February 12 it would be nearest the earth at a distance of about fifty-one million miles, and would then have its maximum brightness of about seventh magnitude and could be picked up in the smallest of telescopes. On January 25 photographs of the comet were obtained with two telescopes at the Naval Observatory and one of these with a ten-minute exposure showed a central condensation and a tail about one-half a degree long.

Comet Cosik-Peltier, in the ten days following its discovery, was observed not only at a number of the leading observatories in the United States, but also at many observatories abroad. Besides Taschkent and Pulkowo, observations were reported from Belgrade, Nice, Babelsberg, Milan, and Poznán, and as a result of these many observations an excellent orbit will be obtainable. Although this little visitor from space has been kindly received by the astronomical world, and many a telescope has followed its course through the heavens, one must still feel a little disappointment that the long-expected *great* comet, for which the astronomer has looked in vain for a generation or more, has not yet arrived. Every announcement of the discovery of a new comet arouses anew the hope that at last it is here, the great comet that may be included among the great comets of all time such as Donati's Comet, The Great Comet of 1882, Halley's Comet, and others that are remembered and recorded from century to century as magnificent and impressive visitors from space, with tails many degrees in length and easily observed.

On April 19 there is to be an annular eclipse of the sun and the path of the annulus will pass over the Aleutian Islands, part of Alaska, and the polar regions, grazing the north pole. Partial phases of the eclipse will be visible over all of Canada and the United States, with the exception of all of Florida but the northern part. The times and circumstances of the eclipse are given in The American Ephemeris for seventy-four cities in the United States. The greatest eclipse in this country will be visible in the northwestern states, where from 50 to 73 hundredths of the sun's diameter will be covered by the moon, at time of maximum eclipse, which will occur there in the early morning. In the eastern states the magnitude of the greatest eclipse will be small, about two hundredths, and it will occur shortly before noon. At Washington, D. C., the magnitude of the greatest eclipse will be only 15 hundredths. The eclipse will begin there at 10:51 A.M., greatest eclipse will be at 11:40 A.M. and the eclipse will end at 12:31 P.M. The southern limit of the partial eclipse will pass through Mexico and Florida and in the southern states the partial phase will be very small.

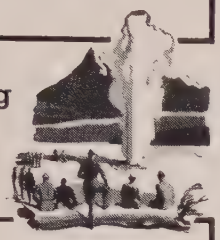
From April 20 to 22 is the period when one may see meteors belonging to the swarm known as The Lyrids, which have their radiant in the constellation of Lyra. They should appear in greatest numbers late in the evening of the 21st, and should be seen to advantage this year as there will be no moonlight. They are swiftly moving as they are met by the earth "head on" and one should look for them in a general northeast direction.

On April 21 there will also be a close conjunction of Jupiter and Venus in the morning sky. The two planets will be less than half a degree apart. Venus rises on April 15 about one and a half hours before the sun. For several days Jupiter and Venus will form a fine double star in the early morning sky. Mercury is in inferior conjunction on April 3, and will be too close to the sun to be seen until the last week of the month, when it is near western elongation and may be seen in the east before sunrise. Mars is now in Sagittarius and is rapidly growing brighter. It is visible the last half of the night. Saturn will be in conjunction with the sun on April 11 and too close to it to be seen this month.

Mountain Magic in Washington

Snow fields and Alpine meadows to explore on Mt. Rainier and Mt. Baker; bathing on Pacific Ocean beaches; wilderness trails on the Olympic Peninsula; romantic waterfront towns; sailings to British Columbia and Alaska. Write for free booklet, "Pacific Northwest Vacation Suggestions."

Geyser Gazing in Yellowstone



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CAMERA TRAILS

(Continued from page 179)

or open the diaphragm one stop and leave the shutter speed set at the 1/100th. For an "x4" filter, the diaphragm would need to be opened two stops, or the shutter speed divided by four. Find out what the factor of your filter is for the film you are using from the maker or the dealer who sold it to you, and make the necessary increase.

* * *

Willoughby's, Inc., of 110 West 32nd Street, New York City, have issued a new general price list with a four-page supplement showing their color photography supplies. Nature photographers should write for their copy, asking for S-1138 and supplement, and mentioning this department.

* * *

The Raygram Corporation of 425 Fourth Ave., New York City, has a number of items that will help the Nature photographer. Tell that you want the pamphlets collected for readers of this department.

* * *

Two books seem to have particular appeal and value to the Nature photographer. "Pictures at Night" by M. U. Wallach (Knight Publishers, Inc.) sells for fifty cents and contains not only good reproductions of many kinds of night shots, but also the data on their making.

"Wildfowling with a Camera" by Lorene Squire (Lippincott Company, Philadelphia, $7.50) is a ten years' collection of splendid pictures of native North American wild fowl and most interesting text. Any NATURE reader will enjoy the book and find it a source of photographic inspiration.

* * *

Another book on the "must" list for all photographers is "The Fundamentals of Photography" by Dr. C. E. K. Mees. It is published by Eastman Kodak Company at $1.00, and holds the sort of information we all need whether we are beginners or have made many pictures. It is a technical book in non-technical language.

* * *

Filing negatives is a constant problem. As a solution, the Wholesale Radio Service Company of 100 Sixth Ave., New York City, has announced the Lafayette Negative Filing Books in several sizes. Mention us when you write for your copy of the booklet.

* * *

Consistently good negatives are impossible without a reliable thermometer. The Weston Electrical Instrument Company of 626 Frelinghuysen Ave., Newark, N. J., supplies one that lives up to the reputation of its makers for accuracy and dependability. It is all metal and may be used in tanks or trays. Write to the makers for their descriptive circular.

* * *

Agfa Ansco has just brought out a new 52-page booklet entitled "Selecting Your Miniature Camera Film" which holds enough information to allow us to select the film for our purposes with real certainty. It is so valuable that we are adding it to our permanent list and you may receive your copy either from this department or direct from Agfa Ansco, Binghamton, New York. Whether or not your camera is a miniature, you will find the booklet helpful.

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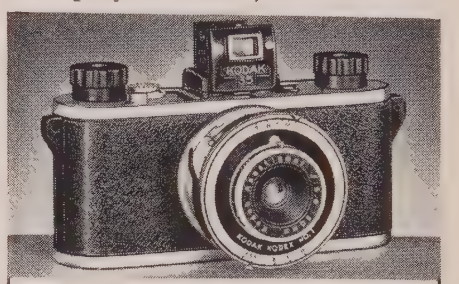

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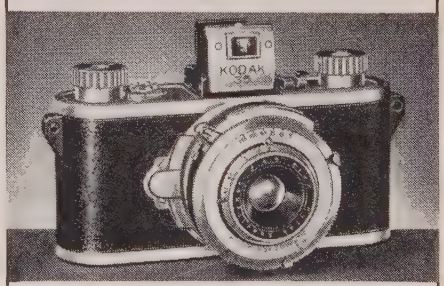
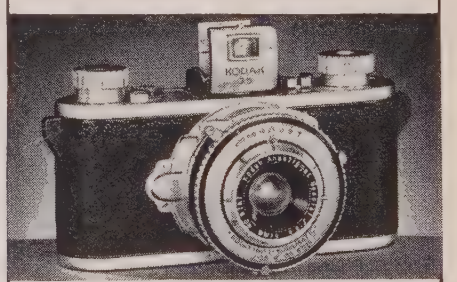


KODAK 35, Kodak Anastigmat *f*.4.5 lens, Diomatic shutter (4 speeds to 1/150, delayed action), **$24.50**—a new low price.



KODAK 35 with Kodak Anastigmat Special *f*.3.5 lens, and Kodamatic shutter (5 speeds to 1/200, delayed action), **$33.50**—a new low price.

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THE SCHOOL PAGE ★★★

EDITED BY DR. E. LAURENCE PALMER

Professor of Rural Education, Cornell University, and Director of Nature Education, The American Nature Association

Reptiles in School

Would that it were possible to get figures on how many teachers who have read the title of this article have already mispronounced the word "reptile." The accent is on the first syllable and the "i" is not long. It is probable that fully as many people misunderstand reptiles as mispronounce the name. The article in the center of this number of *Nature Magazine* was prepared in the hope that some of these misconceptions might be corrected.

Among the reasons for these misconceptions undoubtedly is the fact that reptiles have for the most part been studied vicariously. We have believed what we have been told or what we have read and ordinarily have not ventured to make first-hand acquaintance with representatives of the group. It is a safe venture to make that more elementary school children know something about extinct dinosaurs than have had the experience of handling some living reptile with genuine pleasure. The popular "reptile study" merit badge of the Boy Scouts of America may be won by a boy who is afraid to handle the common and harmless snakes of his own backyard, largely because every unit in it is based on knowledge which may be found in books and not one demands a first-hand experience with the creatures. To get a rowing merit badge a boy must row; to get a radio merit badge he must send a message; but to get a reptile merit badge he needs only to know what the books tell him and he need not know much of that.

Any school experience with reptiles should include some study of the living animal. An excellent general guide to reptile study in schools is to be found in the new edition of Comstock's *Handbook of Nature Study* just off the press in February. Some of the questions that may be answered by direct observation are:

How does the animal move from place to place? If it is a snake, can it move easily over a smooth glass surface? Do the plates on the bottom of a snake overlap like shingles pointing to the rear, to the fore or neither way? May this position be changed? If the reptile is a turtle, does it swim with a breast-stroke or by the crawl method? If the reptile is a lizard, such as a horned toad, can it burrow easily into loose soil and if so, how? If it is a lizard like a chameleon, how does it hang on trees?

How does the reptile satisfy its needs for air? Where are its nostrils placed, and why there? Count the pulsations on the side of a snake or of a lizard to see how many there are in a minute. Exercise the animal and see if this number is changed. A turtle is an air-breather. Can the one available for study remain under water as long as five minutes?

How do the reptiles available for study vary in their ability to see and otherwise sense their environment? Can a snake close its eyes? How about a turtle and a lizard? A snake's tongue is evidently an organ of sense that it thrusts out to acquaint itself with what is taking place nearby. Must a snake open its mouth to stick out its tongue, and if not, why not? Let a snake come to rest on a hard surface such as a table top. Yell at it to see if there is any evidence that it becomes increasingly nervous. Jar the table lightly by tapping it with a ruler. Does this seem more effective in arousing it than was the sound? How far away from the snake can the table be jarred and still get results. Of course this will vary with different kinds of reptiles and with different individuals. It will also vary with any individual. Snakes particularly may be sensitive to disturbance before they shed their skins and not particularly sensitive after they have been well fed. Turtles will vary greatly in their sensitivity. Normally the species with bodies well protected with shells such as the box turtles will be less sensitive than the more poorly protected snappers and soft-shelled turtles. Why might this be the case?

If the reptiles are kept in a terrarium try to get a record to show at what times of day they are the most active. Are the horned toads more likely to be active in the cool of the evening, the dead of night or in the intense light of the day? Is this equally true of garter snakes?

Investigate the ways in which reptiles take in food and water. How do the jaws of turtles and of snakes differ in their behavior when the animals are eating? What turtles available for study eat their food under water? While a snapping turtle may seize its prey by darting out the head with the help of an extensible neck, is this same procedure followed with a snake? Does a lizard extend its body or its neck when it captures food, and if not what does it extend? Can a lizard capture a meal without extending either its body or its neck and without running the prey down?

Many reptiles will reproduce in captivity or will, if previously mated, lay their eggs or give birth to living young. The eggs or the young of reptiles are so interesting that everyone should have the opportunity of knowing them first-hand. A snapping turtle which has just come from its egg with the yolk-sac still conspicuous, or a newly born red-bellied snake, are so interesting that only the most prejudiced person could fail to wish to know them better.

Most reptiles can be kept in captivity conveniently if supplied with suitable food, water, shelter and temperature. Ordinarily the snakes should have some hard substances against which they may rub when they remove their skins. They should also be able to get to water for drinking purposes though their demands in this direction are not always great. Feed the garter snakes such things as earthworms and sometime give the learner the opportunity of seeing a milk snake or a king snake eat a garter snake. Such a series of experiences will show the food chain that exists, and will point out how species may vary in their usefulness to man. Usually a milk snake which has been kept from food for some time will not wait long before feeding if a suitable garter snake is available. While some teachers may properly object to this demonstration it would seem to be much less objectionable than a recommendation for amphibia study that appears in a Florida state outline, and recommends that the lower grade children trim the tail of a tadpole with shears to see it restore itself. This is diabolical.

Sometimes it is a considerable chore to keep such reptiles as horned toads supplied with an abundance of flies for food. In such cases put a hole through the bottom of their cage. Through this from the bottom thrust the small end of a funnel of wire. The large end of the funnel should point downward. Under the open end of the bottom of the funnel, suspend something which will attract flies. The flies leaving this food will rise through the funnel into the cage for the chameleons or horned toads and will themselves become food. This saves time for the human who has assumed responsibility for the reptiles he has taken under his care. Anyone who intentionally keeps a wild thing from its natural environment must for the sake of common decency see that it is treated properly and not allowed to starve for food or water. With the useful species it is, of course, best to free them to go about their work when they have served their time as instructors in the school.

In these times there is a just emphasis made on integration of any work with other work in a school program. Any study of reptiles offers excellent opportunities here. Of course no school can keep careful records of the number of ground squirrels a gopher snake will kill and the amount of vegetation these rodents would have eaten had the snake not killed them and of the value of this vegetation as food for domestic animals. Instead we will have to turn to the studies of others for help. It is possible that no cheap or free bulletin offers us more help in this connection with the study of reptiles than the late Professor Guthrie's *The Snakes of Iowa* published by the Iowa Agricultural College at Ames, Iowa. The writer was privileged to know the author of this bulletin and there is no better example of a man who learned to really care for reptiles through knowing them better. Other reasonable literature on reptiles is published for New Jersey by the Newark Museum, for Arkansas by the Arkansas Agricultural College, and for Ohio by the *Midland Naturalist*. The school bulletin published by the State Department of Education for California has given reptiles a reasonable treatment.

NATURE MAGAZINE has consistently defended the study of reptiles on a reasonable basis. Reference to the indexes to the various volumes will prove this. Among the more recent pertinent references would be "Soup Personified" and "Once in a Lifetime" in August, 1937; "Sea Iguanas of Galapagos", March, 1937; "Pleistocene Reborn", June-July, 1938; "The Grand Canyon Rattlesnake", October, 1938, and "Seeing Lizzie Home", November, 1938. This series includes references to living and to extinct reptiles of each of the major groups, with suggestions for wisely caring for some of the forms which commonly come under observation. Among the older articles in the magazine of particular worth are those in Volume IX, pages 87 and 362; Volume X, page 151; Volume XII, pages 322 and 372; Volume XV, page 161; Volume XVI, page 100; Volume XVII, pages 179 and 317; Volume XVIII, page 107; Volume XXII, page 31;

THE SCHOOL PAGE

(Continued from page 230)

Volume XXIII, pages 21 and 229; Volume XXIV, page 203; Volume XXV, page 15; Volume XXVII, pages 137 and 147. These and other articles not mentioned should make reptile study both pleasurable and profitable if used to accompany experiences with the animals themselves.

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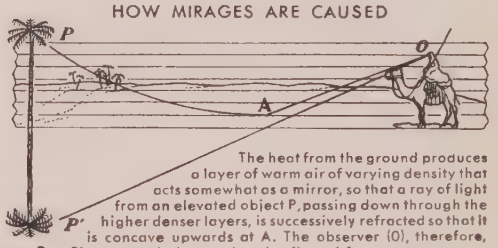
This illusion is a true mirage and is caused in the same way as the desert or marine mirage. This diagram from the New Merriam-Webster shows

HOW MIRAGES ARE CAUSED



The heat from the ground produces a layer of warm air of varying density that acts somewhat as a mirror, so that a ray of light from an elevated object P, passing down through the higher denser layers, is successively refracted so that it is concave upwards at A. The observer (O), therefore, sees P at P' apparently inverted and reflected from water.

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Illinois Meteorite

One day last September Ed McCain of Benld, Illinois, came home from work to find that a meteorite had torn through the roof of his garage, the roof of his automobile and *gone through* the seat and floor-board, finally bouncing back into the seat springs when it hit the muffler. A neighbor, hearing it fall, likened it to the power dive of an airplane. Through the activity of two members of the Joliet Astronomical Society, this celestial arrival, a section of the garage roof and the seat cushion were obtained and are now on exhibition at the Field Museum in Chicago. This is the second recorded Illinois meteorite and is one of only eleven known instances of property damage by a meteorite. An interesting story of this four-pound missile is told in the February issue of *Field Museum News*.

Plant Culture League

Organized on a non-profit basis to further research in the field of plant growing, the Plant Culture League has been formed with headquarters at San Pedro, California. W. F. Huppke is president. A second revised edition of the booklet, *Scientific Tank Farming*, has been brought out and a news letter is issued. For further information write to the League, P. O. Box 1111, San Pedro, California.

Fooling the Starlings

Starlings moved in and usurped the bird feeding stations of Mrs. Robert H. Moore of Alexandria, Pennsylvania. Nothing seemed to discourage them. So Mrs. Moore got a nice smooth pole four inches in diameter. In it she bored holes and filled them with suet, setting the pole up in the yard. This fooled the starlings for a solid week, but then they discovered they could slide down the pole and get a sufficient toe hold on the edges of the suet holes. They quickly learned, but were finally thwarted completely by a block of wood on top of the pole large enough to provide overhanging eaves and prevent the start of the fireman's slide. Holes may be bored right through the pole and filled with suet. A piece of square lumber will do but should not be less than two inches by two, Mrs. Moore advises.

More about the Fly

In our February issue James D. Perdue, after watching a fly take a bath, was moved to wonder if the fly was as filthy as claimed, although he was careful to state that it is "a dangerous germ-carrier, and as such merits no defense." We published this little observation because it was well put and we thought it might stir up response. It has, and Jerome J. Gross comes forward, paraphrasing Mr. Perdue in the following terms:

"An ordinary housefly just landed on my sugar bowl. Pausing to watch him I could not help wondering about the justice of that epithet 'the filthy fly.' Perhaps because today is Sunday, but undoubtedly as just a part of his daily routine, he was giving himself a thorough scrubbing.

"Possibly having just come from a nearby manure pile or garbage heap, its normal breeding places, it was industriously and quickly removing every particle of filth into

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the sugar I would eventually take into my alimentary tract.

"I disgustedly brushed the fly away before it could complete its obnoxious ablution, but it only seemed to scoff at me as it buzzed around the table and landed on the rim of my glass of milk. Circling the rim and the inside of the glass, now and then placing its proboscis over minute drops of milk, it left an invisible trail of germs and dirt which I would soon consume. Almost losing my appetite, I viciously swept it away and it disappeared from my vision.

"Then I began to muse on a peculiarity of the pest's feeding habits. The proboscis is its mouth, a soft, delicate structure which is flattened at the tip and through which it sucks food. The housefly can consume only *liquid* foods. What does it do, then, when it encounters a grain of sugar or some other solid? It regurgitates digestive juices from its salivary glands which dissolve the solid. How does the thought of an insect expectorating in your food strike you? Especially an insect which breeds in filth.

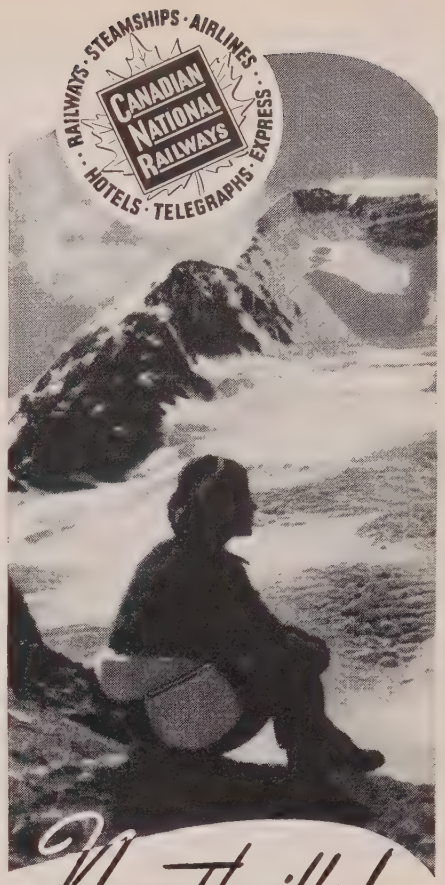
"If only one fly were to perform such disgusting operations once in a while, it would not merit any recognition from me at all, but think of the dozens of flies which pollute our food every day during the spring, summer, and fall. It's surprising that the human race has been able to survive. In view of the circumstances I think it wise to heed the slogan 'swat that fly', and any measures we can take to reduce the numbers of this pest to a negligible degree should be followed extensively."

Canadian National Parks

If your vacation plans for this year include Canada you will wish to provide yourself with copies of one or more of the booklets descriptive of the Canadian National Parks. One of these—*The National Parks of Canada*—tells briefly of the scenic and natural history attractions of the various reservations, and is attractively printed and illustrated. Other booklets are more descriptive in detail of Riding Mountain National Park, Manitoba; Jasper National Park, Alberta; Banff National Park, Alberta, and Kootenay, Yoho, Glacier and Mount Revelstoke National Parks in British Columbia. Two other attractive booklets by Robert J. C. Stead are also available and are entitled *Canada's Mountain Playgrounds* and *Playgrounds of the Prairies*. Copies of these useful booklets will be sent free to any adult planning a Canadian holiday. Write to Department of Mines and Resources, Branch of Lands, Parks and Forests, Ottawa, Canada, and mention specifically in which region you are interested.

Colorado Nature Camp

Combining recreation and education, a two-week Nature camp will be held from June 11 to June 25 by the Walsenburg group of the Colorado Mountain Club. The camp will be located at Cuchara Camps, ten miles south of La Veta, Colorado, and will not be operated for profit but as a contribution of the organization toward awakening interest in the educational and recreational advantages of our great outdoor heritage. Space does not permit our telling all the details of the program but these may be obtained by writing to Paul W. Nesbit, Hufano County High School, Walsenburg, Colorado.



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GRIFFON

THE TOY BREEDS

EVERY known breed of dog has its *raison d'être,* or had it at one time. One supposes that, in the beginning of things, the canine species had one type from which, in the course of the ages, the sixty or more distinct varieties we know today sprang, or were for one reason or another evolved.

The tiny or "toy" breeds have always been popular with women as personal playthings. They were known in our great-grandmother's day as "muff-dogs". Today with increase in apartment-dwelling, the speed and congestion of transportation, and the difficulties inherent to city life, the little dogs are still popular; particularly with women. Certainly it is easier to transport a three pound Pekinese than it is to carry a Great Dane or a Bulldog.

PEKINESE

Pomeranians, Yorkshires, Toy Poodles, Japanese, Chinese and English Spaniels, Maltese, Griffons, Papillons, Chihuahuas and several others figure among the miniature varieties of dogs.

It is supposed by many that because of their small size the little ones are "lap" or "boudoir" dogs, pampered and spoiled and without any of the attributes of what we are loosely accustomed to call a "man's" dog. This may be true in some cases. Even some children are spoiled for life! But a dog is a dog and has all the inherent qualities for which we love a dog, no matter whether his weight be one pound or one hundred pounds.

JAPANESE SPANIEL

The Pekinese was held sacred in China, the country of its origin. It was the royal breed, and exportation of specimens was forbidden until comparatively recently. Its lineage puts to shame any royal or aristocratic human family in the world! We read of it in China many centuries before the Roman Empire fell. It is, peculiarly, a one-person dog. Its intelligence is only equalled by its jealousy and possessiveness.

The German Affenpinscher and the Griffon, both of them weird and amusing in appearance, are, like old soldiers, "fading away" from the scene, if they are not dying out.

The Chihuahua of Mexico is a shivery little creature, ill-adapted to colder climates.

The Pomeranian remains the running favorite among the miniatures, except, of course, the Peke. He is sturdy, hardy, intelligent, clean, easily trained and comparatively long-lived.

POMERANIAN

It is not fair to these little fellows to dismiss them with a sniff because of their size. They can give the companionship and friendship that we look for in a dog. Although often they require some care in diet, they are by no means as difficult to keep in good health as many seem to think.

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On the left-hand pages of these books appear black and white photographs. On the right-hand pages will be found pictures of the same group in colors. These colored pictures when viewed through the red and blue lenses of the ORTHO-SCOPE (which accompanies each book) appear to be in three dimensions.

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Animal Trials

To the Editor:

In the February issue of your magazine, there appears an article on medieval animal trials to which I wish to take exception.

The alleged evidence of these trials, so called, is not even slightly persuasive. Separated by years, sometimes centuries, from the events, a compilation of these documents was made some years ago by a grossly incompetent, biased collector. The majority of these documentary proofs are in foreign languages which may account for their acceptance in the English speaking world.

Now and then our papers carry accounts of dogs which are "tried" and "sentenced", etc., and after giving considerable time and thought to the "evidence" I have come to the conclusion that in medieval times animals were "tried" the same as they are now—that is, not at all.

Animal trials are amusing cartoons, but to keep the record straight, they can impartially be labelled ancient, medieval or modern. In all cases, they are pure fiction.

Sister M. Liguori.
Mundelein College, Chicago.

Wants to Correspond

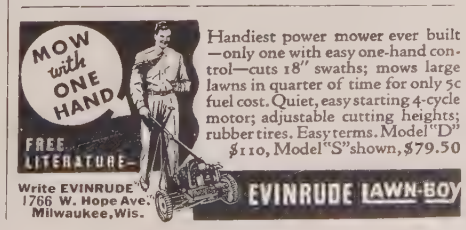
Mr. Glenn Webb of 5348 Ohmer Avenue, Indianapolis, Indiana, is particularly interested in Amphibia and Mollusca, both for study and for collection. He would like to correspond with others having similar interests, with a view to exchanging information and specimens.

Hungry Plants

The latest addition to the excellent list of leaflets of the Field Museum of Natural History in Chicago is entitled *Carnivorous Plants and "The Man-Eating Tree"*, and is written by Sophia Prior. Presented in popular style and attractively illustrated, with a bibliography of more detailed literature on the subject, this leaflet may be purchased from the Field Museum of Natural History, Grant Park, Chicago, for twenty-five cents.

About Larkspurs

Garden lovers who have a special affection for delphiniums will welcome *The Garden of Larkspurs*, by Liberty Hyde Bailey, just published by the Macmillan Company. It is a continuation of the series of specialized garden books and was preceded by those on gourds and on pinks. More than one hundred supposed species are discussed, together with practical information on uses and cultivation. There is also a chapter on delphinium diseases contributed by Leon H. Leonian of the American Delphinium Society, and one on pests by W. E. Blauvelt of Cornell University. This new garden book sells for three dollars.



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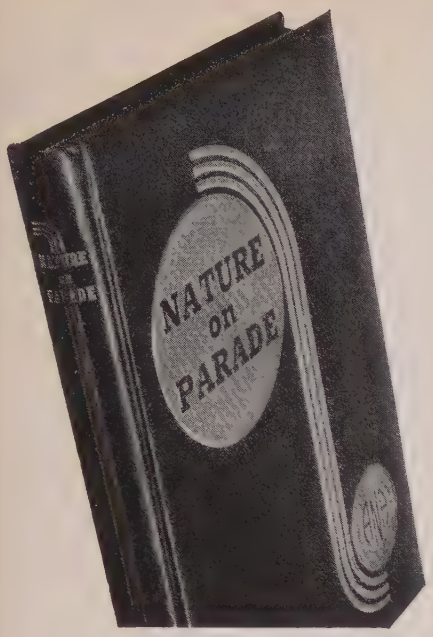

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INDOORS AND OUT

(Continued from page 183)

and flying out, followed by her attentive consort, left the cave, rose high in the air, performing evolutions more curious to see than any I had ever seen before. They flew about over the water, the female leading her mate, as it were, through her own meanderings. Leaving the Pewees to their avocations, I peeped into their nest, and saw there their first egg, so white and so transparent—for I believe, reader, that eggs soon lose their peculiar transparency after being laid—that to me the sight was more pleasant than if I had met with a diamond of the same size. The knowledge that in an enclosure so frail, life already existed, and that ere many weeks would elapse, a weak, delicate, and helpless creature, but perfect in all its parts, would burst the shell, and immediately call for the most tender care and attention of its anxious parents, filled my mind with as much wonder as when, looking towards the heavens, I searched, alas! in vain, for the true import of all I saw."

"On the thirteenth day, the little ones were hatched. One egg was unproductive, and the female, on the second day after the birth of her brood, very deliberately pushed it out of the nest. . . . Never have I so closely witnessed the attention of birds to their young. Their entrance with insects was so frequently repeated, that I thought I saw the little ones grow as I gazed upon them. The old birds no longer looked upon me as a enemy, and would often come in close by me, as if I had been a post. I now took upon me to handle the young frequently; nay, several times I took the whole family out, and blew off the exuviae of the feathers from the nest. I attached light threads to their legs: these they invariably removed, either with their bills, or with the assistance of their parents. I renewed them, however, until I found the little fellows habituated to them; and at last, when they were about to leave the nest, I fixed a light silver thread to the leg of each, loose enough not to hurt the part, but so fastened that no exertions of theirs could remove it."

When April returned and the phoebes came again to the Perkioming Valley, Audubon "had the pleasure of finding that two of them had the little ring on the leg."

AUSTRALIA'S BRONZE-WING

(Continued from page 194)

ing near its nesting place. Unlike other wild birds, the bronze-wing seldom remains shy for long. There have been many cases where individual pairs have become fingertame and take seed from the hands of their keepers. Like most wild fowl, however, this pigeon does not like to be caught and handled, no matter how kindly it is done. In fact, there is nothing that will frighten the bronze-wing more than to be held tightly in hand. Since it is wont to lose its shyness if it is treated gently and cared for properly, it affords the bird lover an excellent medium for close and really delightful observation, which will repay him many times for the care he must give these beautiful birds in order to keep them in good health. Altogether, this beautiful alien is one of the most desirable of this widespread and interesting tribe.

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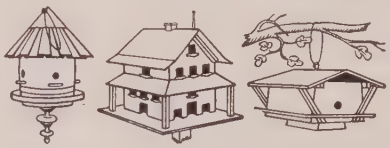

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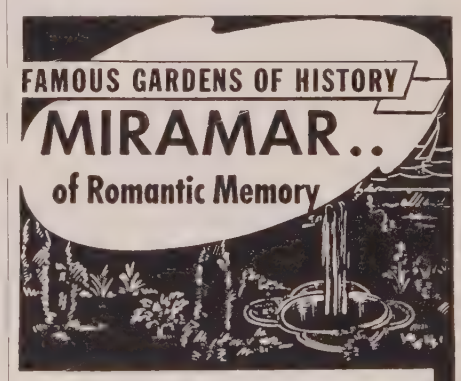

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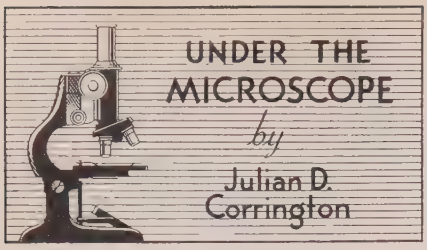

Fingerprints

When the microscope was first invented it was used as a novelty and a toy. People were intrigued by the magnified images of fleas, but for a long time no one seemed to possess any vision of the limitless possibilities of this magical instrument in exploring the structure of our physical world. Later on the microscope came to be identified largely with the field of biology, so much so that perhaps the majority of educated persons today think of microscopes as denizens of the biological laboratory exclusively. As a matter of fact the twentieth century has witnessed the adoption of this instrument, in one form or another, by every branch of modern science, pure or applied. Chemistry, physics, geology, agriculture, industry—all lean heavily on information supplied only by magnification.

Latest of the technical professions to take up the microscope and regard it as a tool of the utmost importance is Criminology, scientific crime detection. Even Sherlock Holmes, you will remember, in the old days when detection was induction, employed a hand lens. Today Sherlock's modern descendant has a wide-field binocular microscope for many general purposes; a comparison microscope for examining specimens of handwriting, typewriting, textiles, paper, ink or hair; a bullet-comparison microscope and one or more photomicrographic outfits; to mention only the more usual instruments.

From time to time we expect to detail uses of the microscope in these many non-biological fields, including several chapters in this fascinating new science of Criminology. Let us begin our explorations, however, with an examination of the oldest and still the most important device in this subject, the study and classification of fingerprints as a means of personal identification.

If you will examine the tips of your own fingers without magnification, you will readily note the presence of numerous fine, more or less parallel ridges, and with a hand lens these are seen distinctly, the pattern resembling plowed furrows, with alternating hills and valleys. The elevations are known as friction ridges and are characteristic of the palms and soles of many mammals. In man they are planed down and vestigial, having been inherited from remote ancestors, in whom they were of great use in climbing and grasping, the ridges running at right angles to the slipping force. Non-skid tires are designed after the same principle.

The pores of numerous sweat glands open along these ridges and keep the skin moist and oily, as becomes apparent whenever you press a finger against a pane of window glass; the oily print left on the glass is a replica of the pattern on the finger and will be retained after application to any smooth surface such as that of furniture, doorknobs, weapons and many other objects. So intricate are these patterns that an endless variation is possible and no two sets of human fingerprints have ever been found to be alike. Their use for personal identification can be traced back into antiquity, but not until modern times have they been employed in criminal detection.

The police departments of federal governments as well as of all large cities maintain enormous files of millions of card records of fingerprints, the use of which accordingly hinges upon some scheme of classification. If a set of prints is found at the scene of a crime they must be keyed out to some sort of designation, largely mathematical, so that a duplicate set, if it exists, may be found quickly in the central files and the offender thus identified.

The famous British biologist, Sir Francis Galton, was among the first to propose a workable scheme of classification of fingerprints, and his methods were later elaborated by Sir E. R. Henry into the basic system in universal use and known therefore as the Henry System. This considers entire sets of prints whereas the Battley System, developed by Chief Inspector Battley of Scotland Yard, enables the comparison of single fingers, while the Moran System, designed by Deputy Sheriff B. B. Moran of San Diego County, California, uses a code whereby a description of a fingerprint may be transmitted by telephone, telegraph or teletype. Specially ruled discs of glass are available for each of these three systems and are employed with a low-power magnifier, usually termed a fingerprint reader. The amateur may, however, use any form of hand lens, reading glass or tripod magnifier and does not need a disc when working with the Henry System, some details of which follow.

The pattern of a single fingerprint falls into one of four categories, known as the arch, loop, whorl and composite, the last being any combination of the other three types. In the arch, ridges pass across the fingertip horizontally from one side to the other, rising upward in the middle of the finger to make an arched appearance, but none of the ridges makes a backward turn. In loops, some of the ridges sweep backward but do not form complete spirals or circles as they do in the whorl print. If the downward direction of the slope of a loop is toward the little finger, it is an ulnar loop, if toward the thumb a radial loop, named from the ulna and radius, bones of the forearm. Whorls may be single- or double-cored.

From large numbers of studies it has been found that arches comprise about 5% of all prints, loops, 60%, whorls and composites, 35%. In the Henry System but two primary divisions are recognized, loops and whorls, abbreviated as L and W. Arches are put in with loops and composites with whorls. The fingers are bracketed together in pairs beginning with the right thumb, thus: right thumb and right index, right middle and right ring, right little and left thumb, left index and left middle, left ring and left little. Conditions in any given set of impressions are then expressed as a fraction, with the first named member of each pair as a numerator, the second as a denominator. If the right thumb is an arch and the right index a whorl, the fraction for this first pair is written $\frac{L}{W}$, and so for the remaining, pairs, a complete set having the following formula, for example: $\frac{L}{W}\,\frac{L}{L}\,\frac{W}{L}\,\frac{W}{W}\,\frac{L}{L}$. The number of possible combinations of these ten letters yields 1024 primary divisions in the scheme of classification.

Arbitrary values are now assigned. If a whorl occurs in the first pair it counts 16, in the second pair 8, third pair 4, fourth pair 2 and fifth 1. Loops are scored as zero. Translating the above formula into these numerical values we have $\frac{0}{16}\,\frac{0}{0}\,\frac{4}{0}\,\frac{2}{2}\,\frac{0}{0}$, which, added is $\frac{6}{18}$. One is then added to both numerator and denominator to avoid zeros in cases where only loops are present, our fraction thus becoming $\frac{7}{19}$ and the whole is now inverted, giving $\frac{19}{7}$ the primary classification number under which the card record is filed.

Since some of the numbers thus formed are encountered rather frequently, for instance $\frac{1}{1}$ in cases where only loops are present, sub-

A LOOP

A WHORL

AN ARCH

division is necessary. Abbreviations for the two index fingers will help, $\frac{1U}{1A}$ indicating a set wholly of loops, where the right index finger is an ulnar loop and the left one an arch. Where whorls predominate, ridge tracing is a device that will provide additional classification numbers. In our illustration of a whorl, note whether the lower limb coming from the point of forking of ridges at the left margin of the print passes inside (I), meets (M) or passes outside (O), the corresponding ridge from the fork on the right side. This point is determined for the index and middle fingers, such a number as $\frac{32\ MO}{32\ IO}$ expressing these tracings in which the right index finger is M, right middle finger is O, left index I and left middle O.

Finally, ridge counting is appended for the two little fingers, and where necessary for others also. This gives the number of ridges crossed by a straight line in passing across the print from one fixed point to another. Note in our illustration of a loop a point near the extreme margin of one side where nearly parallel ridges coming into the print from outside diverge or fork, one limb passing upward, the other downward. This point of forking is the delta; loops have one, whorls two. The extreme central unit of the print is the inner terminus or point of core, and the ruling of a fine straight line across a print from delta to point of core, or the use of a ruled glass disc in the same manner, enables an operator with a magnifier to count the number of ridges intersected by such a line. If this count gave 5 for the right little finger and 19 for the left, the fraction $\frac{5}{19}$ is appended to previously determined values, so that a complete designation might then read: $\frac{1}{17}\ \frac{U}{U}\ \frac{11}{10}\ \frac{5}{19}$ and this is the classification number under which the card is filed.

If this work interests you, consult Sir E. R. Henry's "Classification and Uses of Fingerprints" at your library for fuller details. Amateurs may conduct a good many experiments in this subject with ease. Make and classify your own set of prints and then those of your friends; on small blank cards collect prints of different types, striving to get as many kinds as possible. Clubs may go further by setting up evidence from an imaginary crime. For example, with fingerprints of all members of the club on file, one member is secretly chosen to represent the criminal and another the detective, unknown to each other as such. The criminal then leaves his fingerprints at the supposed scene of the crime, as on a polished table top, and the detective finds these, dusts them with talcum powder, using a camel's-hair brush and blowing off excess powder, photographs these impressions and then compares his results with the cards in the file in order to announce the culprit.

Technique

Would you like to know how to make a set of fingerprint impressions in the professional manner? The best way is to go to your local police station or sheriff's office and ask the man in charge of this work to make your own set and show you how it is done. He will be glad to cooperate. If this is not possible, proceed as follows:

Secure a flat slab of any hard, smooth material, as plate glass, slate, marble or metal and coat it with a small amount of black printer's ink. Roll the ink out smoothly with some form of rubber roller—a photographer's print roller, discarded typewriter platen, or piece of broom handle over which has been pulled a section of smooth rubber hose. Use a good quality of paper, not too highly glazed; cards are still better for this work. The F. B. I. uses cards measuring 8 x 8 inches.

Two people are necessary, an operator and the subject. The operator grasps the subject's right thumb with both hands and applies it to the inked slab, left edge of ball of thumb first, then rolling over to the right edge, with moderate pressure, and lifting away cleanly, avoiding smudging. He then carries the thumb across to the impression sheet or card and again applies the thumb in exactly the same manner, making a rolled print. Each finger of the right hand is then treated in this same manner, one at a time, in proper sequence, the five prints appearing along the top of the card to form an upper row. Then come the left thumb and fingers in a second row beneath their mates.

Rolled prints are followed by plain prints, all four fingers of both hands being stamped upon the card simultaneously, without rolling, beneath the two rows of rolled prints. In the center are the two thumbs, taken together. These plain prints provide a check on the rolled set in case any one of the latter should have been applied inadvertently out of sequence. On the back of the card add data as to sex, age, height, weight, color of eyes and hair and finish with the signature.

Beginner's Primer

In the December issue we described the way in which insects are classified, and promised a list of orders, since these are zoological facts with which all microscopists should be acquainted.

The Class Insecta or Hexapoda is the greatest of all animal assemblages, including a larger number of species as well as individuals than all other groups combined. It has been remarked in numerous publications that the number of species in even a single family of insects is greater in several cases than the stars visible on a clear night. No wonder that a systematic classification is necessary to handle so vast a coterie!

In spite of this appalling array of numbers, however, the primary classification into orders is not difficult in most cases; the beginner can soon learn to assign correctly nine-tenths of all of his captives. Entomologists are not yet in agreement as to the exact number of insect orders, and schemes of classification differ, most of the difficulty centering around certain aberrant or rare groups seldom seen by any save the expert. Ignoring, then, for our purposes, the more elaborate setups found in advanced texts, let us first learn a simplified form of insect classification, embracing the following twenty-one orders, to be discussed in this and following issues.

On a basis of the type of metamorphosis exhibited, some entomologists divide the class into three subclasses, the Ametabola having no metamorphosis, the Heterometabola an incomplete one, and the Holometabola a complete one. In the first of these subclasses are two small orders of inconspicuous species which nevertheless furnish material of great interest to the microscopist. An older

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name for these two orders combined was the Aptera, meaning wingless, and introducing us to the root word *pteron,* Greek for wing, which forms the basis of most order names among insects. Modern taxonomists (specialists in classification) have, however, separated the Aptera into the following orders:

1. *Order Thysanura* (tassel-tail) the Bristle-tails; very primitive insects showing affinities to centipede-like ancestors; no wings, chewing mouthparts, no metamorphosis; jointed hair-like appendages on the end of the abdomen, vestiges of appendages on other abdominal segments in some species. The Fish-moth or Silver-fish is a common household pest, eating paste and glue and thereby damaging books, laundry or wall paper. Under a microscope the shining minute scales on these tiny creatures exhibit beautiful markings. The Fire-brat is similar and noted as frequenting such warm and even hot places as fireplaces and ovens.

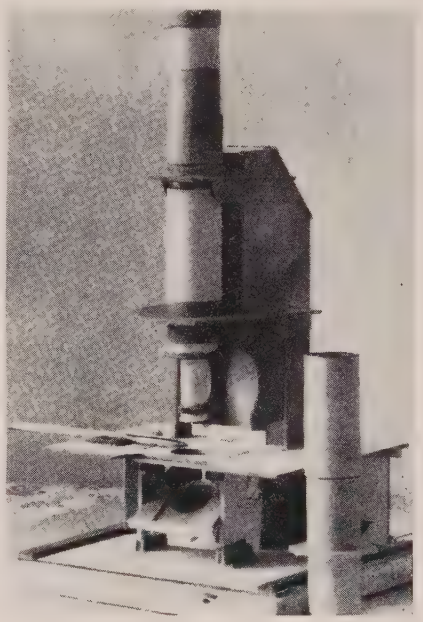
2. *Order Collembola* (glue-bolt or bar), the Spring-tails, also a very primitive group, without wings or metamorphosis, and with chewing mouthparts in most, sucking in a few. Many of these forms are microscopic and only a few attain one-fifth of an inch in length. Under magnification, many of them present a most comical appearance and they make excellent subjects for whole mounts, though somewhat difficult to collect and to free from a glue-like secretion which is produced by the collophore, an organ on the underside of the first abdominal segment. Most species bear a caudal spring which is bent forward and held in place under tension by a catch on the third segment; when released this spring-board catapults the animal high in the air for a distance of several feet, —a truly prodigious leap for so small an organism. They are found under stones, moss, decayed leaves and wood, in crevices of bark, or on damp vegetation, and one form, the Snow-flea, appears in great numbers on the surface of snow in winter, springing away from our feet on all sides.

Next month we will begin a survey of insect orders belonging to the Heterometabola, those which exhibit an incomplete metamorphosis.

A Home-Made Microscope

A song and a shoestring—such is a description of the cost of a compound microscope made by Arturo Borges Badell, of Santiago de Cuba, who has kindly sent us the accompanying illustrations and description. The materials for this ingenious instrument include an old 120 Brownie camera, a sharp knife or razor for cutting, some pieces of stiff cardboard, two tubes of 120 roll film, a cap from a tube of shaving cream, a small concave mirror and some glue or cement! Fancy concocting a microscope from such an assemblage! Yet that is just what Señor Badell has done, and the job looks workmanlike too.

Fig. 1, B and C are tubes of rolled 120 film, while A is cardboard, about 5″ long and of a diameter so that the film tubes will slide up and down with a tight fit. The cardboard is black, or is painted black inside. The camera is dissected and the lenses of the view finders removed to serve as the microscope lenses. E is a circular piece of cardboard, painted black, to the under side of which is cemented one of the two larger camera lenses,



BADELL'S MICROSCOPE

thus making an ocular which is glued to film tube B.

At the bottom of the other film tube, C, is attached another circular ring of cardboard, F, to which is glued a smaller tube, D, 1″ long by ½″ diameter. The bottom of this tube, D, bears still another cardboard ring, G, with a centered opening 3/16″ in diameter and housing one of the two smaller viewfinder lenses as an objective. Higher power, however, may be obtained by placing a short collar of cardboard around this piece, G, leaving a margin of ¼″ to receive a cap from a shaving cream tube, in the center of which a hole is drilled to receive, carefully centered, the second of the two smaller camera lenses. Both tubes, B and C, should slide freely in tube A in securing a focus.

Fig. 2 explains details of manufacture of the stand. B is a base piece of wood, 6 x 7″, with a central notch at one edge to receive A, glued. A is of cardboard or wood, about 10″ high, and receives the cardboard stage, C, as indicated, while cardboard pieces, F, hold the mirror. C is approximately of same size as B and has a one-inch aperture, centered. The mirror, D, consists of a concave lens glued to cardboard and is pivoted to pieces, F, by pins, exactly centered beneath the aperture.

To attach tube to stand, two pieces of cardboard as in Fig. 2, E, are made so that the square notch fits stand (Fig. 2, A) and circular hole fits tube, A, of Fig. 1 tightly. Connections are made as in the photograph of the completed instrument, the two supports 2″ apart. The optical axis of the tube must be vertical and centered over the stage aperture. Señor Badell concludes by stating that since these lenses are not corrected for chromatic aberration, a monochromatic light should be employed by using a complementary filter to the color of the object being studied, thus: red filter for blue-stained preparations; green for red; blue for yellow; red for green; blue for brown; green for purple and yellow for violet. Place filter between light source and mirror. In focusing, adjust the objective tube first, then the eyepiece.

Trade Note

For distribution this month to those of our readers who send in a request with a three-cent stamp for postage we have a piece of interesting literature from R. & J. Beck, Ltd., of 69 Mortimer St., London, W. 1, England. This firm is one of the oldest and most important manufacturers of optical equipment in the British Isles and their products are well known throughout the scientific world. The principal instrument that they produce today is termed the London Microscope, supplied with every sort of equipment from simple to complex, and priced, according to this equipment, from fifty to two hundred and twenty-five dollars.

Fig. 1.

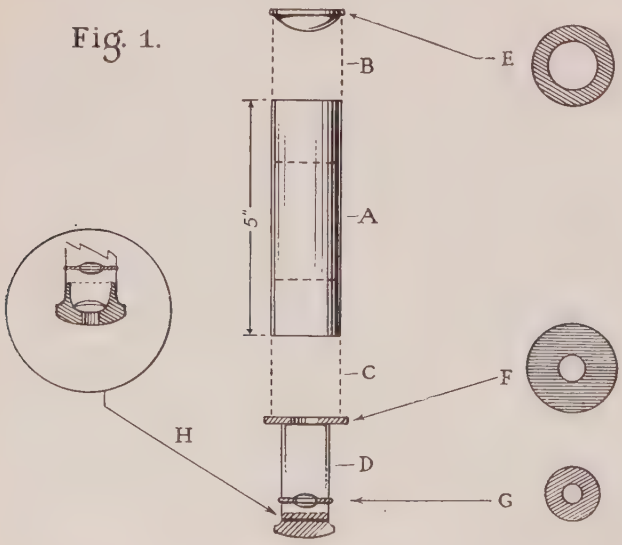
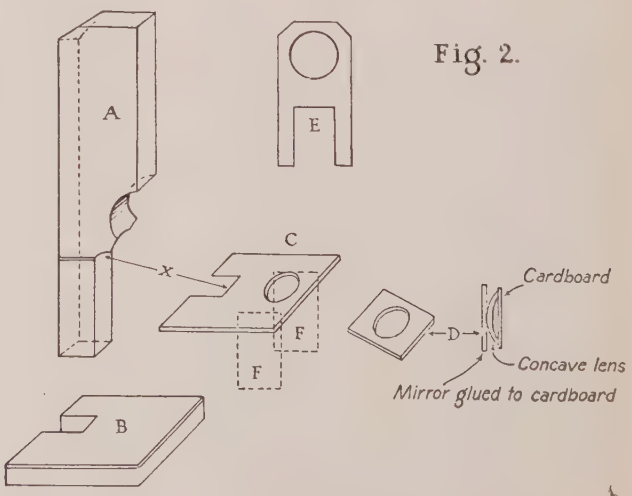


Fig. 2.



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Sounding Crater Lake

So far as is known Crater Lake, Oregon, is the second deepest lake in the world, Lake Baikal, in Siberia, being credited with greater depth. However, the work of sounding carried on last summer will be continued this year to gather more data on the underwater topography of the lake, which is the central feature of Crater Lake National Park. The lake was formed through some ancient volcanic cataclysm that destroyed a mountain peak believed to rival Rainier, and left a crater surrounded by jagged walls 4000 feet high. Intensive sounding, it is hoped, will shed new light on the geological history of the region.

Yellowstone Elk

The January-February issue of the Nature notes of Yellowstone National Park has particular value for the material on the history of the Yellowstone elk herd. It is written by Leon Evans, and will be supplemented by data on range studies and the efforts that have been made in solving the problems of management of these animals.

New National Monument

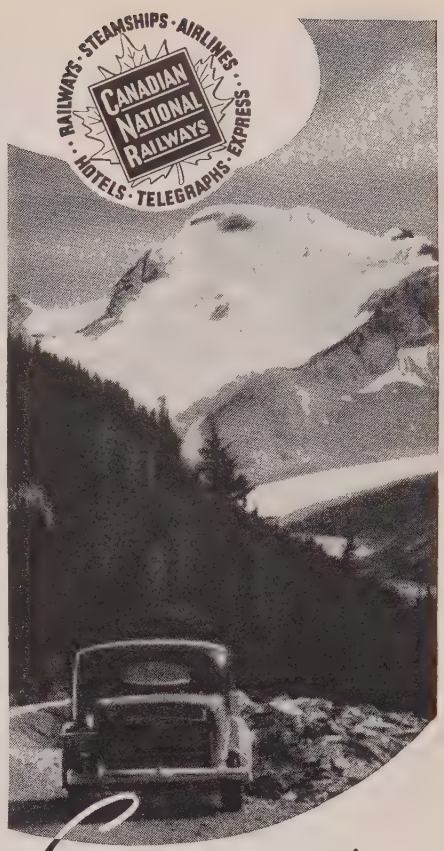
Slightly more than 150,000 acres of southwestern South Dakota have been set aside as the Badlands National Monument by proclamation of the President. It will preserve typical Badland country and important geological features.

Mountain Lion Maligned

A mountain lion nonchalantly drinking from a water trough at Yaki Point was recently reported by a park ranger in Grand Canyon National Park, Arizona. This point is frequented by thousands of visitors to the world-famous scenic wonder. Increase of this great native cat is welcomed by science because of a better understanding now prevailing as to the valuable mission performed by the mountain lion. It is now acknowledged that when man kills predators the so-called "harmless" species increase beyond all bounds. The mountain lion, by maintaining the deer population within the limits of the grazing capacity of the range and by tending to eliminate the weaker individuals, is serving a useful purpose, bettering the stamina and breeding qualities of the very species upon which it preys.

School in the Forest

When the sessions of the Allegany School of Natural History open on July 5, it will be for the thirteenth season. This "school in the forest" draws its students from all parts of the United States. All-day classes permit extended field trips and laboratory examination of specimens on the spot. Then courses are offered in four fields, and these are both college credit and non-credit. Full details about the course may be obtained from Miss Esther W. Eno, Buffalo Museum of Science, Buffalo, New York.



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Using an Exposure Meter

The approach of summer brings not only more opportunities for pictures but also a stronger light in which to make them. This stronger light means that the shadows are more clearly defined and in far greater contrast to the bright areas than they were all winter, and this extreme contrast in turn demands that we be more careful with our exposures. The average modern film has a contrast range of 128 to 1; some even put it as high as 256 to 1. This is just another way of saying that the modern emulsions are capable of recording correctly a tone range in which one tone is one hundred or more times as bright as another. The usual scene has a range of thirty or forty, and it is clear that we may make a number of different exposures that will all be correct in that each of them will record the values of the scene in their proper relation to each other and none will be exposed too much or too little. It is equally clear that as the contrast range of the scene increases, the accuracy with which we place our exposure in the range of the film must also increase if the deepest shadows and the brightest highlights are to be shown as they appeared to our eye when we made the exposure. The guesses that gave us satisfactory negatives when the contrasts were less in the more diffused light of winter will not result so uniformly when summer comes, and we must turn to some better method of calculation.

Exposure helps are in three main classes: charts or calculating machines that are available in many forms; tables that may take into consideration six or seven factors that might affect the time that a particular stop requires; meters that are either of the extinction type, in which we usually select the faintest letter or number we can see, or of the photo-electric cell type, which actually measures the light reflected from the scene. All of these aids have their supporters who swear by the reliability of their special friend, and all of them are good. The best one for each of us is the one that gives us consistently good results, and that means good results in the prints we make from the negatives.

Tables usually consider the month, time of day, subject, strength and direction of the light. They are based on some one film at a given shutter speed or aperture, and require adjustment for another sensitive material, filters, and other speeds and settings. The various calculators often take these into consideration, and with a sliding or revolving scale permit rapid determination of the best exposure. Both of these helps require judgment and the personal element is important. We must choose from experience the class of subject we are taking and the strength of the light, but using them thoughtfully for a few rolls of film will teach us how to handle them to obtain good results. They take up little room in the case or pocket.

Extinction type meters also require some judgment and experience, but to a less degree, and they are usually calibrated in such a way as to allow for all the variable elements. They are inexpensive and small, and are probably more widely used than any other exposure device.

Photo-electric meters reduce the personal element to the minimum, but they cost more and are more bulky and comparatively fragile. In time the cells lose their pep and need to be renewed, but they are the most accurate advisers a beginner can have.

Whatever the sort of exposure guide we may use, we must calibrate it, so to speak, to our own methods and equipment, for there are many variables that the maker of the meter could not know about. The shutter of our camera may be slow or fast, the stop markings may be inaccurate, the developer we use may affect the working speed of the emulsion, and we may prefer heavier or thinner negatives than the average. All these cannot be anticipated by the exposure meter maker, and, indeed, they may compensate for each other and not affect the negatives at all. The maker of the instrument, however, supplies with it a list of films and gives each of them a rating by which we may set the meter for the film we use, and in this list he tries to give us enough information to allow us to make correct exposures from the start. Some of these ratings are based on laboratory tests and calculations that have slight value in the field, but most of them are an attempt to place the forty or so tones of our scene in the middle of the range of the negative so that we may have the greatest possible latitude both above and below the center.

To calibrate all this to our own methods sounds complicated, but it simply needs the exposure of part of a roll of film and the recording of the data of each exposure. With the table or calculator determine the right exposure to use. With the extinction type meter, check the figure that seems to fit the meter's directions and from it find the exposure. The photo-electric meter will tell us the average reading almost directly. Let us suppose that the exposure should be 1/50th second at $f/8$. Set the camera on a tripod, or some solid support, and make five exposures of the same scene, the first at $f/4$, the next at $f/5.6$, the third at $f/8$, the fourth at $f/11$, and the last at $f/16$. If our camera does not have all these openings, the diaphragm may be left at $f/8$ and the exposures made at 1/10th, 1/25th, 1/50th, 1/100th, and 1/200th second. If the negatives are to be developed at the camera shop, we can tell them not to cut them apart, or we can mark the different negatives by having an accomplice walk into one side of the scene for the first and move progressively across it as we make subsequent exposures. Keep an accurate record of all settings and, when the prints are at hand, compare them to determine which is the best. It may be that we shall prefer hereafter to rate the films we use at half or twice the speed given it by the maker of our exposure guide; or we may decide to

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pick a dimmer or brighter figure in our meter. In any event, we shall have learned much about our meter and what we can expect from it, and we shall also have seen the effect of over- and under-exposure. The prints from the negatives that were exposed longer, or with the larger aperture, will emphasize the darker and the nearer parts of the scene, while those from the less-exposed negatives will rather ignore the foreground and bring out the distance and the lighter areas. Care in interpreting our results will help us, then, to stress the parts we prefer of the scenes we picture later, and our calibration test will help us in many ways. Several of the best photographers we know make such a test three or four times a year, and whenever they try a new film. (Perhaps it is things like this that make them good photographers!)

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This and That

A new "World's Fair Edition" of the Abe Cohen's Camera Exchange catalog is now available. It lists everything from the tiniest gadget to the last word in cameras and will be sent without cost to all Nature readers who write to the exchange at 142 Fulton Street, New York City, and mention this department.

For the Nature photographer who wishes to retain all the depth and three dimensional perspective in his pictures the perfect solution to the problem is the stereoscopic picture, the same two-picture affair that we used to enjoy at grandmother's when we stuck the card into the viewer and watched the two merge into one and become lifelike. Until recently, these stereos had to be made with a double camera if there was any motion in the subject, but now there is an attachment that fits any camera and permits us to make them as easily as we do our regular shots. It is called Stereotach. The cost, including the viewer, is $11.75. A booklet describing Stereotach and its use will be sent on request to this department. Please enclose a three-cent stamp.

A new back that handles 35 mm. film (Kodachrome, if you wish) for the famous Makina camera has been announced by the distributors, Photo Utilities, Inc., of 10 West 33rd Street, New York City, who have a pamphlet describing the back and other new accessories for the Makina. The same organization has also published a new "Exposure

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CAMERA TRAILS

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Manual" that includes a listing of the speeds of all the available films as well as much valuable information on the use and manipulation of exposure meters. The manual is available at 25c per copy. Please mention NATURE MAGAZINE when you write for either the "Exposure Manual" (enclosing the quarter) or the Makina accessory leaflet, which is free.

For making enlargements, an automatic timer is a great convenience and leads to better pictures as the photographer's hands are free for dodging and other manipulation during the exposure of the print. The Hankscraft timer is simple to use and works efficiently. It is sold for $10 by the Hankscraft Company, Madison, Wisconsin. Write for their descriptive folder.

A new MEMO camera has been announced by Agfa and is priced at $35. It uses special cartridges and is especially quick and easy to load. The film is advanced by a new method that involves only the movement of a sliding lever, and the whole camera is designed to simplify and speed up operation as much as possible. Mention this department when you write for your descriptive pamphlet to the Agfa Ansco Corporation at Binghamton, New York.

The Bell and Howell Company of 1801 Larchmont Ave., Chicago, Ill., have announced reductions in the prices of most of their movie cameras and projectors. A card to the above will bring you their interesting list.

Real enjoyment of slides whether black and white or in color depends largely upon the efficiency of the projector used. The Spencer Lens Company of Buffalo, New York, has issued a booklet describing their new machine that may be used to show both the standard size and the 2″ by 2″ as Kodachromes are usually mounted. Write for your copy.

Camera Trails is designed for those readers of NATURE MAGAZINE who are interested in amateur photography and the making of better pictures, and maintains a service to render assistance with photographic problems. You are invited to take advantage of this service. Address all inquiries to Camera Trails or Norris W. Harkness, Nature Magazine, 1214 Sixteenth Street, Washington, D. C.

Chicago Naturalist

Published for the members of the Chicago Academy of Sciences, *The Chicago Naturalist* is a quarterly of interest to those in the field of natural history. It made its bow in 1938, and in its four issues of last year presented much of value and interest, primarily for naturalists of the Chicago area. There appears to be no single copy or subscription price, but anyone interested in receiving this publication regularly should write to the Chicago Academy of Sciences, Lincoln Park at Clark and Ogden Avenues, for a sample copy and details as to membership in the Academy.

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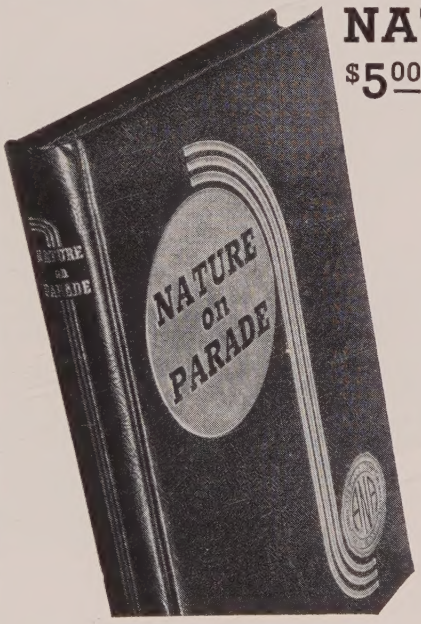

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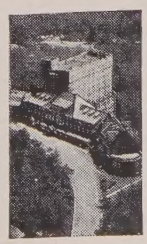

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Indoors and Out

By HOWARD ZAHNISER

VISCOUNT GREY of Fallodon felt that the study of wildlife is such a recreation to man because "it opens a door through which self-consciousness escapes and leaves him free for a time from moral doubts and strivings," and Viscount (or Sir Edward) Grey was a man who knew both wildlife study and moral strivings. His three works that have found their way into my small collection of books show ample evidence of this, and they come sharply to mind as I anticipate May during National Wildlife Restoration Week in a March that finds the news of our own race so tense that it is indeed difficult to "consider the lilies of the field."

One of these works, *Twenty-five Years, 1892-1916,* tells of Grey's experiences as a statesman, especially during his years as Foreign Secretary while Great Britain was entering the World War. The first sentence of his introduction says: "It is of vital importance to the world that there should be a true account of the events that led up to the Great War: without this there can be no right understanding of the causes of the war; and without such understanding nations will not perceive how to avoid the recurrence of another and greater disaster."

Sir Edward may have overestimated the influence of truth on international affairs, and in any case it seems unlikely that his document of experience in moral strivings is on the current reading list of the many statesmen who are looking for signs of the time in *Mein Kampf.* Even without cynicism, one might suspect a discouraging futility in all Sir Edward Grey's writings for the benefit of succeeding generations of statesmen.

As one turns from *Twenty-five Years* to the same author's *Fallodon Papers* one can readily imagine what a relief it must have been for Grey, the Foreign Secretary, to return to his waterfowl at Fallodon. "I think on the whole the dominating aspect of Outdoor Nature is that of pleasure and joy," he wrote in one of these papers, and he pointed out that "the best kind of pleasure in Outdoor Nature does not depend on novelty, but upon enjoying things in the seasons of the year."

These Fallodon papers are mostly reprinted addresses—on the pleasures of reading, on Wordsworth's too-little-read poem "The Prelude", on pleasure in outdoor Nature, on public life, waterfowl, fly-fishing, and on recreation. This last includes Grey's account of his most remarkable birding excursion with Theodore Roosevelt. "It is no more a necessary qualification for the Secretary for Foreign Affairs in London than it is for the President of the United States," he explained, "that he should know the songs of the birds."

I sympathize with those who have not known *Fallodon Papers,* though I almost envy them their still available privilege of a first reading. After reading a library copy, I pursued the book for ten years in my own second-hand-bookstore fashion, twice missing a purchase narrowly and once even buying a copy only to have it fail of delivery. Months later this copy, with my sales slip still in it, was purchased in the same store by my good friend Paul Oehser, from whom the copy I now possess arrived last Christmas with the terse note: "This is not the same copy." Such experiences are not as irrelevant to the enjoyment of good books as they may seem.

My copy of Grey's *The Charm of Birds* came to me across the Atlantic recently from John Grant's bookstore in Edinburgh. It contains the only good words that have come to me from Europe for a long time, and in fact it was a quotation from this work that led me into this discussion. *The Charm of Birds* is a better book than *Fallodon Papers* even, but only because there is more in it. Following up the earlier recommendation of "enjoying things in the seasons," this later volume includes a series of essays on the months, together with several other essays on various aspects of the bird life that charmed and relieved Grey at intervals through a strenuous life.

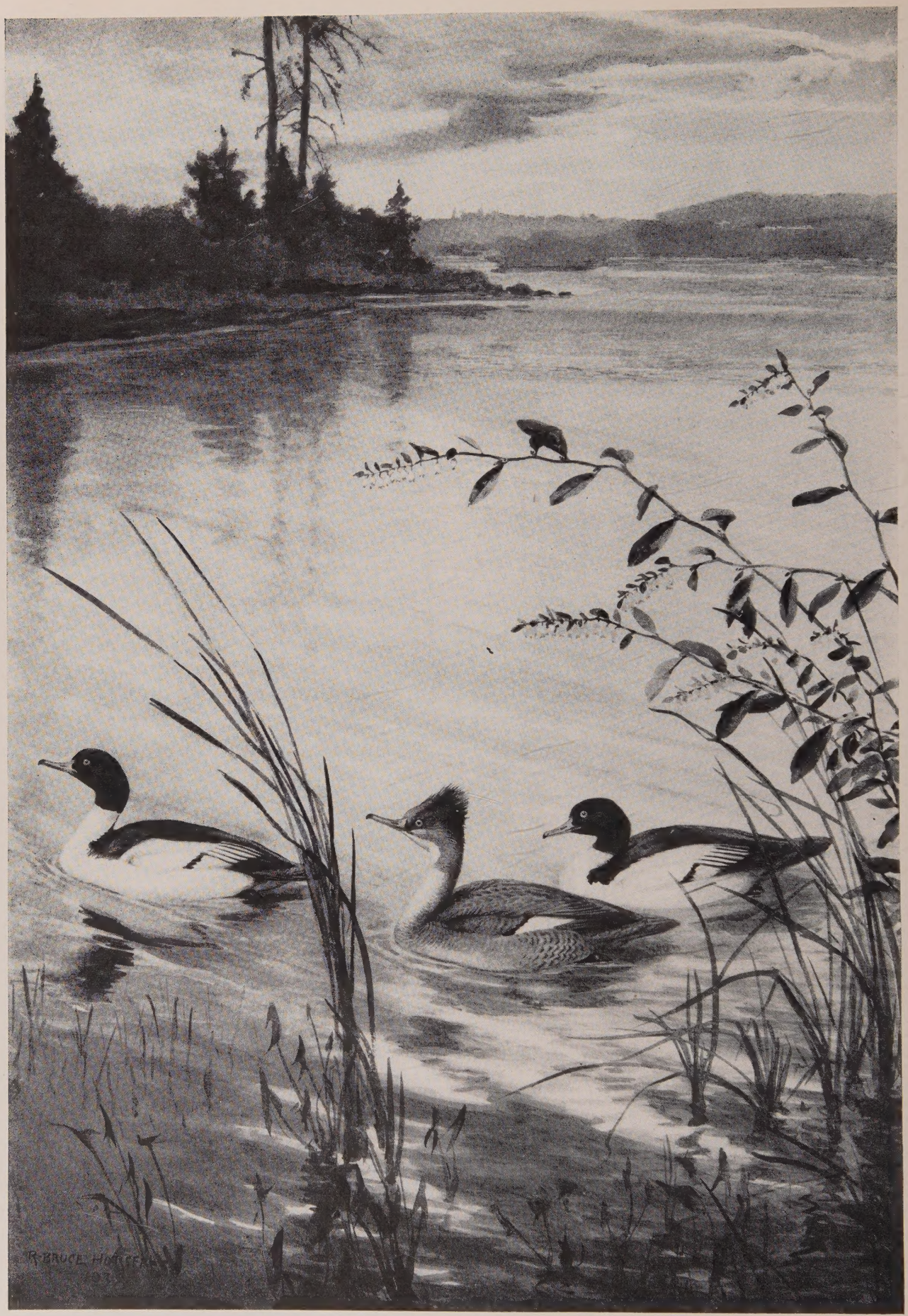
It is certainly much more pleasant to anticipate the month of May this year with *The Charm of Birds* in hand than it is with *Twenty-five Years* open before one.

"In May we are overwhelmed," Grey wrote, but he had no thought of national defense against this sort of overwhelming. "New green is spreading everywhere; flowering shrubs and trees and flowers of garden and field are far too abundant for separate notice; all those birds yet named in this book, and more than these, are in full song. Neither eye nor ear, nor outward nor inward sense of man is equal to it. Each of us can select for especial and particular enjoyment a few things . . ."

For myself I should probably choose the blossoms and foliage of the locust trees and the colors and song of the orioles for peculiar enjoyments in May, though I could well understand any other choices—trillium, clintonia, azalea, columbine, dogwood, buckeye, warblers, tanager, wrens, rose-breasted grosbeak, indigo bunting, to mention but a few competitors for attention in a month that is characterized by profusion.

If we are to continue to expect only more disillusioning and faith-dulling news dispatches and broadcasts, I trust that for our own sanity's sake we can get oftener into the outdoors this year. If it were not so unquestionably futile, I would wish that every statesman in the world could arrange to take some foreign diplomat on a bird excursion during the first week in May and, like Roosevelt and Grey, forget the reporters for twenty hours. I think we would have less to fear from the mistakes of statesmen.

I am afraid, however, that we shall have to abandon any plans for arranging such excursions for statesmen with so many present pressing engagements, but I believe that if more of them were even aware of the world of wild things we would have fewer anxieties. Perhaps there is some hope in this thought, for (Continued on page 289)



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